



P3260 AIR FLOW BENCH

INTRODUCTION

Cussons Wind Tunnel, together with the various ancillary items and special experimental equipments, form a comprehensive laboratory facility, which enables detailed experiments in various aspects of subsonic aerodynamics, convective heat transfer and air flow studies to be performed.

All Cussons equipment is supplied with comprehensive operating manuals which provide full instructions for each experiment, relevant theory, sample results, graphs where applicable and full maintenance details.

FEATURES

- ◆ Open atmosphere wind tunnel with nozzle, measuring section and diffuser.
- ◆ Large range of add-on experiments in aerodynamics, heat transfer and air flow.
- ◆ Effective lift and drag measurement with optional P3262
- ◆ Additional equipment easily and quickly fitted.
- ◆ Mobile self-contained unit with storage shelf.
- ◆ Well instrumented, including sloping manometer and pitot static tube.
- ◆ Optional multi-tube manometer.
- ◆ Optional data logging modules.

EXPERIMENTAL TOPICS

(some require optional equipment)

- ◆ Flow and drag around models
- ◆ Lift and drag of an aerofoil
- ◆ Effect of flaps and slots
- ◆ Visualisation of Aerofoil flutter
- ◆ Air flow in ducts
- ◆ Bernoulli's experiment
- ◆ Tube wall to air convective heat transfer
- ◆ Heat transfer in a shell and tube heat exchanger
- ◆ Flow visualisation using smoke generator
- ◆ Boundary layer growth

P3260

WIND TUNNEL 300mm SQUARE

DESCRIPTION

The P3260 Air Flow Bench consists of a welded steel frame, mounted on castors, and provides a work surface for experiments and integral storage space. An axial impeller directly driven from a variable speed motor, provides the necessary air flow for experiments. The impeller is capable of providing a flow of 9000m³/hr at a static pressure rise of 500 Pascals.

The flow enters through a nozzle section that conditions and accelerates the flow into the measuring section which measures 320mm by 320mm and is 500mm long. The measuring section has a removable side panel to allow very easy access to the models and test pieces. Different side panels can be used to support complex structures and heat transfer experiments. A base point for the mounting of models and the P3262 two component balance is provided. Downstream of the measuring section the diffuser expands the air out to the impeller, which is protected by a guard.

An electrical enclosure is mounted on the upper work surface and contains the single phase input variable speed drive controller which integrates a contactor and start - stop pushbuttons. The enclosure provides electrical power for optional additional equipment.

The instrumentation supplied with the Air Flow Bench comprises a dual multi-slope manometer and a pitot static tube for traversing the duct. An optional data logging system with various modules is available to provide suitable inputs to Cussons P7141 data logging system, or similar data loggers.

TENDER SPECIFICATION

P3260 - Air Flow Bench

Steel-framed bench on castors with work surface and ample storage; axial fan and A.C. motor; electrical enclosure containing with single phase variable speed drive controller and start - stop pushbuttons; inlet contractor nozzle to provide 4 to 1 area reduction fitted with lattice flow straightener, 500 mm long by 320 mm square clear perspex measuring section. The measuring section to have a removable side panel and additional instrumentation access points. Instrumentation is to comprise of a traversable pitot static tube with 100-0-100 mm scale and dual multi-slope manometers.

The P3260 is to be suitable for use with a range of models and aerofoils and for use with the Cussons P3262 two component balance.

SERVICES REQUIRED

Single phase 220/240V, 50Hz supply. Other voltages by request.

PHYSICAL DETAILS

	Nett Weight		Length		Width		Height	
	kg	lb	m	in	m	in	m	in
P3260	120	264	2.8	110	0.85	34	1.5	59

ADDITIONAL EXPERIMENTS

The modular design of the P3260 wind tunnel bench enables numerous add-on units to be used with this bench, ensuring that the scope of the work which can be dealt with can be enlarged as required. The primary use of the bench is for aerodynamic experiments but further experiments are available for heat transfer and for more basic air flow work.

AERODYNAMIC EXPERIMENTS

P3262 or P3262e- Two Component Balance

Lift and drag can be measured through a gimballed balance. The gimbals are made with low resistance ball bearings. The balance can be supplied either for load determination by weights or as electronic transducer output P3262e

P327 series - Models for drag and lift needs P3262

A range of models are available for use with the two component balance. These include

- P3270 aerofoil section,
- P3271 aerofoil with flap and slot,
- P3272 streamlined shape,
- P3273 75 mm diameter cylinder
- P3274 75 mm diameter sphere,
- P3275 75 mm hemisphere,
- P3276 75 mm disc,
- P3277 75 mm ring,
- P3278 75 mm square plate,
- P3279 75 mm Vane.

All models require the optional P3262 to be purchased.

P3268&69 - Pressure Models

Models provided with pressure tapping points to allow the pressure distribution over the model to be determined.

- P3268 75 mm diameter cylinder,
- P3269 aerofoil section.

N.B. Requires P3202 multi-tube manometer or P3206 data logging.

P3267 - Flutter Wing Model

Experiment to demonstrate wing flutter, including an aerofoil section supported on eight un-damped springs.

P3280 - Boundary Layer Apparatus

For the study of build-up of boundary layers on a flat plate having both sharp and rounded leading edges. The velocity profile adjacent to the model surface is investigated by means of a vernier mounted pitot tube.

HEAT TRANSFER

P3218 - Cross Flow Heat Transfer Apparatus

The use of electrically heated tubes positioned transversely to the direction of air flow, enables a series of forced convection heat transfer co-efficients to be derived for varying flow rates and model configurations. Experimental equipment is supplied complete with an electrical control and instrumentation box that is also used for the additional heat transfer experiments (P3212/3).

P3214 - Parallel Flow Heat Transfer Apparatus

Determination of Nusselt/Reynolds Number relationship for heat transfer from wall to air both inside and outside of heated tubes in parallel flow orientation. This is an additional experiment to P3219 Cross Flow Heat Transfer Unit.

P3215 - Mixed Flow Heat Transfer Apparatus (Simulated Shell And Tube)

This unit is provided as an additional experiment to P3219 demonstrating the heat transfer process from tube wall to air within a tube bundle.

AIRFLOW DEMONSTRATION

P3202 - Multitube Manometer

For convenient and simultaneous measurement of up to fourteen pressure tapping points.

P3204 - Anemometer

A telescopic thermistor anemometer for the direct measurement of low air velocities in the range 0-30m/s.

P3281 - Bernoulli's Experiment

A three-dimensional method of demonstrating Bernoulli's Theorem by measurement of static and total heads.

P3282 - Flow Around A Bend

Demonstration model basically in clear acrylic material to illustrate the pressure profile of an air stream flowing round a bend. Requires the use of P3202 Multitube Manometer.

P3234 - Turbulent Jet

Experiment to determine the pressure profile of an air jet by the use of a traversable pitot tube.

P3233 - Smoke Generator

Equipment includes a smoke generator to demonstrate visually the flow of air around models.

DATA LOGGING

P7141 - Data Logging System for Air Flow Bench

Data acquisition module to suitable for providing. The data acquisition module provides input to any PC with USB port. The logged data can be transferred into spreadsheets or other data analysis software

P3206 - Data Logging for Multiple Pressures

Data logging modules for use with P3205 providing 0-10V analogue signals for fourteen air pressures scaled from -25 mbar to +25 mbar.

P3262e - Data Logging Module for Two Component Balance

Data logging module for use with P3205 and P3231 providing two 0-10V analogue signals representing lift and