


# Imperial College London

## 10' × 5' Wind Tunnel

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The background image shows a large, modern wind tunnel facility. In the foreground, a large, circular test section is visible, featuring a detailed model of a city with various buildings and structures. The model is made of light-colored material and is surrounded by a grid of small, dark, conical objects. The tunnel itself has a high ceiling and large glass windows, allowing natural light to enter. The overall atmosphere is clean and professional.

The newly refurbished 10' × 5' Wind Tunnel is a highly reconfigurable temperature-controlled, closed-loop facility with two test sections offering a wide range of features covering just about any study involving airflow. It provides an excellent facility for aerodynamic development and safety evaluation studies of road and race cars, aircraft, buildings and structures. The lower test section is a full 20 m long (one of the longest test sections in Europe) and a 3 m x 1.5 m cross sectional area. It is equipped with a rolling road, traverse and full boundary layer control. It continues the tradition of the previous tunnel with very high quality flow and the facility is complemented by a comprehensive range of instrumentation which enable measurements of force, pressure and flow velocity to be made accurately and efficiently. The upper test section is in effect a large wind testing arena 18 m in length and 5.7 m x 2.8 m cross sectional area. It is especially ideal for wind environment testing, pedestrian comfort studies and wind loading studies on civil structures.

Both test sections are outfitted with an intelligent fully computerised control system and tunnel local area network for the distribution of data. Brand new National Instruments hardware and state-of-the-art LabVIEW based data-processing software enable the user to make maximum use of the facility.

The wind tunnel is part of the National Wind Tunnel Facility, an EPSRC and ATI initiative aimed at making world-class facilities available to all scientists, [www.nwtf.ac.uk](http://www.nwtf.ac.uk).

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**NWTF** 

# Specifications

<b>Type</b>	Closed return, closed twin test sections. Twin axial flow fans with pre-rotation and straightening vanes. Fully computerised National Instruments control and LabVIEW based data acquisition.
<b>Lower Test Section</b>	3.05m wide x 1.524m high x 20m long
<b>Upper Test section</b>	5.7m wide x 2.8m high x 18m long
<b>Air Speed</b>	Empty tunnel speed range is 0-40 m/s lower section, 0-13m/s upper section. Infinitely variable with precision air speed control.
<b>Flow quality</b>	Flow uniformity (lower section) $\pm 1.0\%$ ; Turbulence $<0.25\%$ ; Boundary layer Deficit $<0.5\%$
<b>Moving Floor</b>	Dimensions: 1.84m (6') wide x 2.4m (7.87') long. Speeds up to 40 m/s; infinitely variable. Full boundary layer control applied at two points ahead of the moving floor. Automatic adjustment of under-floor suction to prevent belt lift. Water cooled platen. Yaw adjustment from $-5^\circ$ to $+20^\circ$ .
<b>Balance and Strut</b>	The wind tunnel is equipped with an automated strut and balance:- Six component load cell balance and automated strut. The balance is designed to be installed within a 33% or 40% scale racing car or other road vehicle. It is supported by a streamlined strut which can move the car vertically and in pitch. Automatic ride height and pitch control is by means of pre-programmed computer control. Manual yaw and roll adjustment. Four complementary wheel drag balances are available. Data acquisition and processing is fully automatic.  Typical Ranges:- Lift 1000N, Drag 250 N, Pitching Moment $\pm 150$ Nm, Side Force $\pm 250$ N, Yawing Moment $\pm 75$ Nm, Rolling Moment $\pm 40$ Nm, Wheel Drag 50 N.

# Specifications

## Pressure

128 Channel PSI Initium pressure scanning system allowing instantaneous collection of pressure information at any time.

## Traverse

Precision 3 axis probe supporting traverse.

Computer controlled ranges of movement are:-

Stream wise 4m, Across flow 3m, Vertically 1.5m (positionable anywhere in the lower section)

A range of pressure sensing, hot-wire and hot-film probes are available. Dantec miniCTA and Dantec Streamline Constant Temperature Anemometers are available.

## Paint

Pressure sensitive and Temperature sensitive paint.

## Section model testing

Static and dynamic section model testing for bridge section or aerofoil sections.

## Other Instrumentation

Powerful Class-4 high and low speed laser systems for PIV, LDA and other flow visualisation techniques.

## Flow visualisation

Smoke wands, surface fluorescent oil flow.

## Model Assembly

There is a lockable workshop suite for the hirer's use while renting the wind tunnel.

## Access

We are situated in Central London with easy access through all forms of transport. The tunnel is situated close to a vehicle unloading area. Unloading is therefore quick and convenient.

## **Contact Us**

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