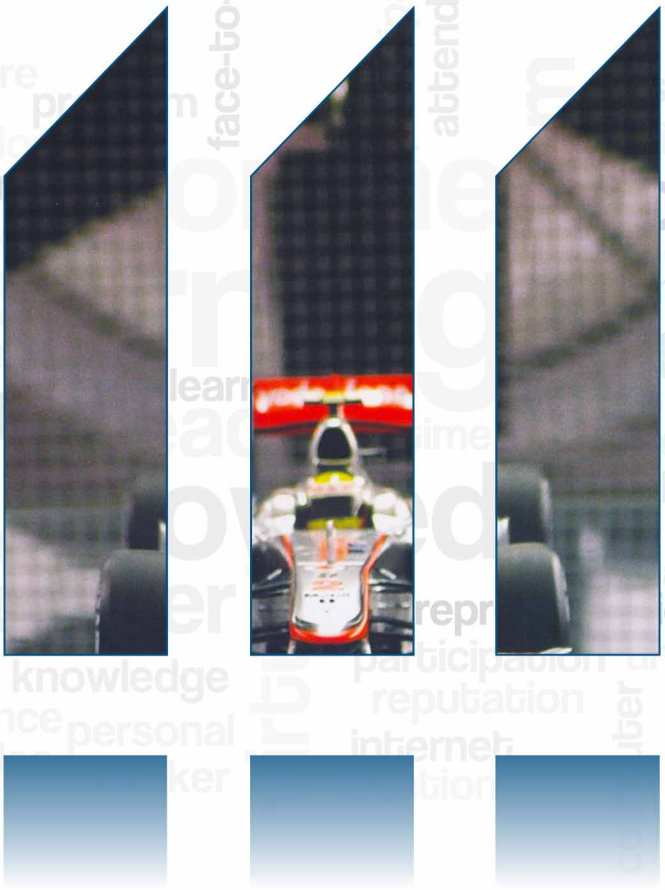

Aerodynamics

infoWERK
medien & technik

AF100

Subsonic Wind Tunnel

Open-circuit subsonic wind tunnel for a wide range of investigations into aerodynamics

Works with VDAS®

Computer, chair and work table shown for photographic purposes only (not included)

Screenshot of the optional VDAS® software

- Saves time and money compared to full-scale wind-tunnels or airborne laboratories
- Operates at meaningful Reynolds numbers
- Compact, open-circuit suction design
- Wide variety of experiments in aerodynamics
- Comprehensive selection of optional instrumentation, models and ancillaries
- High levels of safety
- Controls and instrumentation conveniently mount on a separate, free standing frame
- Works with TecQuipment's Versatile Data Acquisition System (VDAS®) to allow accurate real-time data capture, monitoring and display on a computer

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TecQuipment

AF100 Subsonic Wind Tunnel

Description

A compact, practical open-circuit suction wind tunnel for studying aerodynamics. The wind tunnel saves time and money compared with full-scale wind tunnels or airborne laboratories, and it offers a wide variety of experiments.

The wind tunnel gives accurate results and is suitable for undergraduate study and research projects. TecQuipment offers a comprehensive range of optional models and instrumentation, including a computer-based data acquisition system.

Air enters the tunnel through an aerodynamically designed effuser (cone) that accelerates the air linearly. It then enters the working section and passes through a grill before moving through a diffuser and then to a variable-speed axial fan. The grill protects the fan from damage by loose objects. The air leaves the fan, passes through a silencer unit and then back out to atmosphere.

A separate control and instrumentation unit controls the speed of the axial fan (and the air velocity in the working section). The control and instrumentation unit also includes manometers and electrical outlets to supply electrical power to other optional instruments.

The working section of the tunnel is a square section with a clear roof, sides and floor. The sides are removable. The floor and each side panel has a special position to support the optional wind tunnel models. Supplied with the wind tunnel are a protractor and a model holder to support and accurately adjust the angle of any models fitted.

A Pitot-static tube and a traversing Pitot tube fit on the working section, upstream and downstream of any models. They connect to the manometers of the instrumentation unit (or other optional instruments) to show pressure.

A metal frame supports the wind tunnel. The frame includes lockable castors for convenient mobility.

Electronic sensors on the optional wind tunnel instrumentation can connect to TecQuipment's Versatile Data Acquisition System (VDAS®, not included). VDAS® allows accurate real-time data capture, monitoring, display, calculation and charting of all relevant parameters on a suitable computer (computer not included).

Standard Features

- Supplied with a comprehensive user guide
- Five-year warranty
- Manufactured in accordance with the latest European Union directives

Experiments

A wide variety of subsonic aerodynamics experiments (some need ancillaries), including:

- Flow past bluff and streamlined bodies with pressure and velocity observations in the wake
- Investigations into boundary layer development
- Influence of aspect ratio on aerofoil performance
- Performance of an aerofoil with flap, influence of flap angle on lift, drag and stall
- Pressure distribution around a cylinder under sub and super-critical flow conditions
- Study of characteristics of models involving basic measurement of lift and drag forces
- Study of the characteristics of three-dimensional aerofoils involving measurement of lift, drag and pitching moment
- Study of the pressure distribution around an aerofoil model to derive the lift and comparison with direct measurements of lift
- Drag force on a bluff body normal to an air flow
- Flow visualisation

Essential Services

Electrical supply (three phase):
220 VAC to 240 VAC 50 Hz/60 Hz (20 A)

or 380 VAC to 440 VAC 50 Hz/60 Hz (16 A)

Space needed:
Solid, level floor – allow at least 2 m of free space around the inlet and 4 m at the outlet

Operating Conditions

Laboratory environment

Storage temperature range:
–25°C to +55°C (when packed for transport)

Operating temperature range:
+5°C to +40°C

Operating relative humidity range:
80% at temperatures < 31°C decreasing linearly to 50% at 40°C

Specification

Nett dimensions and weight (assembled):
3700 mm x 1065 mm x height 1900 mm and 293 kg

Approximate packed volume and weight: 4.9 m^3 and 450 kg

Working section:
305 mm x 305 mm, and 600 mm long.

Air velocity: 0 to 36 $m.s^{-1}$

Noise levels:
80 dB(A) at operators ear level.

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AF100 Subsonic Wind Tunnel

Available Experiment Models

TecQuipment makes many ancillaries for the wind tunnel. These include optional models, instruments and extra or different instruments that you need to work with VDAS® for data acquisition.

Refer to this page and the next page for full details of which instruments you need to do tests with the models.

Refer to the separate datasheets for full details of the optional models and instruments.

- Cylinder Model with Pressure Tapping (AF101)
- 150 mm Chord NACA0012 Aerofoil with Tappings (AF102)
- 150 mm Chord NACA2412 Aerofoil with Variable Flap (AF103)
- 150 mm Chord NACA0012 Aerofoils (AF104)
- 100 mm Diameter Flat Plate (AF105)
- Flat Boundary Layer Model (AF106)
- Aircraft Model - Low Wing (AF107)
- Aircraft Model - High Wing (AF108)
- Three Dimensional Drag Models (AF109)

Recommended Ancillaries

- Versatile Data Acquisition System (VDAS-F)
- Multi-Tube Manometer (AFA1)
- Basic Lift and Drag Balance (AFA2)
- Three-Component Balance (AFA3)
- Angle Feedback Unit (AFA4)
- Differential Pressure Transducer (AFA5)
- 32-Way Pressure Display Unit (AFA6)
- Pitot-Static Traverse (300 mm) (AFA7)
- Smoke Generator (AFA10)

Ancillaries – Minimum Instruments (if you do not need automatic data acquisition)

This table lists the instruments you need for experiments with the optional models if you do not need automatic data acquisition.

Models	Minimum Instrumentation
• Cylinder Model with Pressure Tapping (AF101) • 150 mm Chord NACA0012 Aerofoils (AF104) • 100 mm Diameter Flat Plate (AF105) • Three Dimensional Drag Models (AF109)	• Basic Lift and Drag Balance (AFA2) or • Three-Component Balance (AFA3)
• 150 mm Chord NAC0012 Aerofoil with Tappings (AF102) • Flat Boundary Layer Model (AF106)	• Multi-Tube Manometer (AFA1)
• 150 mm Chord NACA2412 Aerofoil with Variable Flap (AF103) • Aircraft Model - Low Wing (AF107) • Aircraft Model - High Wing (AF108)	• Three-Component Balance (AFA3)

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AF100 Subsonic Wind Tunnel

Ancillaries – Instruments needed for Automatic Data Acquisition

This table lists the instruments you need which work with VDAS® for data acquisition.
Note: You also need the frame-mounting VDAS-F interface unit (which includes the VDAS® software).

Models	Minimum Instrumentation for data acquisition
• Cylinder Model with Pressure Tapping (AF101) • 150 mm Chord NACA0012 Aerofoils (AF104) • 100 mm Diameter Flat Plate (AF105) • Three Dimensional Drag Models (AF109)	• Differential Pressure Transducer (AFA5) x 2 • Pitot-Static Traverse (300 mm) (AFA7) and either • Basic Lift and Drag Balance (AFA2) or • Three-Component Balance (AFA3) with Angle Feedback Unit (AFA4)
• 150 mm Chord NAC0012 Aerofoil with Tappings (AF102)	• Differential Pressure Transducer (AFA5) x 2 • Pitot-Static Traverse (300 mm) (AFA7) • 32-Way Pressure Display Unit (AFA6)
• 150 mm Chord NACA2412 Aerofoil with Variable Flap (AF103) • Aircraft Model - Low Wing (AF107) • Aircraft Model - High Wing (AF108)	• Pitot-Static Traverse (300 mm) (AFA7) • Differential Pressure Transducer (AFA5) • Three-Component Balance (AFA3) with Angle Feedback Unit (AFA4)
• Flat Boundary Layer Model (AF106)	• Differential Pressure Transducer (AFA5) • 32-Way Pressure Display Unit (AFA6)

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