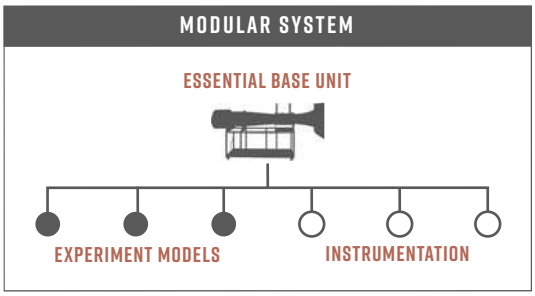
SUBSONIC WIND TUNNEL 300 MM

VDAS® AF1300

A compact, free-standing open-circuit suction subsonic wind tunnel with a working section of 300 mm by 300 mm and 600 mm long, allowing students to perform advanced study such as analysing boundary layers, performing flow visualisation and observing velocity in the wake, offering extensive teaching and research functionality.

SCREENSHOT OF THE OPTIONAL VDAS® SOFTWARE



- Safe, compact, open-circuit suction wind tunnel – a cost effective solution when compared to full-sale wind tunnels
- Additional models and instruments available to extend the range of experiments
- Wind tunnel controls mount on a separate, free-standing instrument frame for ease of use
- Also available as a starter set (see opposite)

"We recently purchased a wind tunnel for the training of our aeronautical engineering students from TecQuipment. The product was easy to set-up, straightforward to operate and I am confident will continue to be used for many years to come. The service and training that TecQuipment provides makes them a pleasure to work with."

SEAN HAINSWORTH
MILTON KEYNES COLLEGE

MODEL CAR IN THE SUBSONIC WIND TUNNEL

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LEARNING OUTCOMES:

TecQuipment can also supply optional models and instruments to extend experiments, giving:

- 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
- Flow visualisation

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 grille before moving through a diffuser and then to a variable-speed axial fan. The grille protects the fan from damage by loose objects. The air leaves the fan, passes through a silencer unit and then back out to the atmosphere.

AVAILABLE EXPERIMENT MODELS:

STARTER SET AF1300S

Included with the wind tunnel in this starter set are:

- Basic Lift and Drag Balance (AF1300z)
- Set of Three-dimensional Drag Models (AF1300j)

RECOMMENDED INSTRUMENTATION:

ALTERNATIVE PRODUCTS:

SUBSONIC WIND TUNNEL (AF1300) EXPERIMENT MODELS

- Simple and quick to set-up and use
- Some models include pressure tappings for pressure distribution experiments
- All models work with the other optional instruments for the AF1300 Subsonic Wind Tunnel

CYLINDER MODEL WITH PRESSURE TAPPING AF1300A

A cylinder model with a single pressure tapping point. The model spans the full width of the working section of the wind tunnel.

NACA 0012 AEROFOIL MODEL WITH TAPPINGS AF1300B

The aerofoil has 20 static pressure tappings along its chord on the upper and lower surfaces. They each connect to tubes that pass through the aerofoil and then out to clear, numbered, flexible tubes.

150 MM CHORD NACA2412 AEROFOIL WITH VARIABLE FLAP AF1300C

An unsymmetrical section (cambered) aerofoil with adjustable flap. The adjustable flap allows students to study the effects of control surfaces such as flaps, ailerons, elevator or rudder.

150 MM CHORD NACA0012 AEROFOILS AF1300D

A set of two aerofoils. One aerofoil has a span that extends the full width of the working section of the wind tunnel. This model has the characteristics of a two-dimensional aerofoil. The other aerofoil has a span that extends for half of the working section of the wind tunnel. This model has the characteristics of a three-dimensional aerofoil.

100 MM DIAMETER FLAT PLATE AF1300E

This model shows the flow around a bluff body mounted normal to the air flow direction, and the drag force exerted on it.

FLAT PLATE BOUNDARY LAYER MODEL AF1300F

Demonstrates boundary layer development and separation. The model is a flat plate that spans the full width of the wind tunnel working section. It has aerodynamically shaped blocks mounted across the plate at different distances from the leading edge.

AIRCRAFT MODEL – LOW WING AF1300G
AIRCRAFT MODEL – HIGH WING AF1300H

Model aircraft with NACA profile wings. One has a low wing position (bottom of the fuselage), the other has a high wing position (above the fuselage).

THREE-DIMENSIONAL DRAG MODELS AF1300J

A set of five different shaped models with identical frontal area to allow students to compare the different coefficient of drag for each shape. Includes a dummy stem for tests to cancel out the drag due to each model's support arm.

S1210 AEROFOIL AF1300L

An unsymmetrical aerofoil that spans the full width of the working section of the wind tunnel, for two-dimensional experiments.

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SUBSONIC WIND TUNNEL (AF1300) INSTRUMENTS

BASIC LIFT AND DRAG BALANCE VDAS® AF1300Z

Measures lift and drag forces on models mounted in the AF1300 Subsonic Wind Tunnel.

- A two-component balance to measure the lift and drag forces on models mounted in the AF1300 Subsonic Wind Tunnel
- Transmits the force on the model directly to a strain-gauged load cell with digital display

SHOWN FITTED WITH THE PROTRACTOR FROM THE AF1300 WIND TUNNEL

The balance mechanism enables test models with a rigid support arm to be mounted and held securely in position in the working section of the wind tunnel. The arm transmits the force on the test model directly to a strain gauged load cell. The load cell is connected to a readout unit with a digital display, which is powered by a desktop power supply (included).

ANCILLARY FOR:

- Subsonic Wind Tunnel (AF1300) 41
- Cylinder Model with Pressure tapping (AF1300a) 43
- 150 mm Chord NACA0012 Aerofoils (AF1300d) 43
- 100 mm Diameter Flat Plate (AF1300e) 43
- Three-dimensional Drag Models (AF1300j) 43
- S1210 Aerofoil (AF1300l) 43

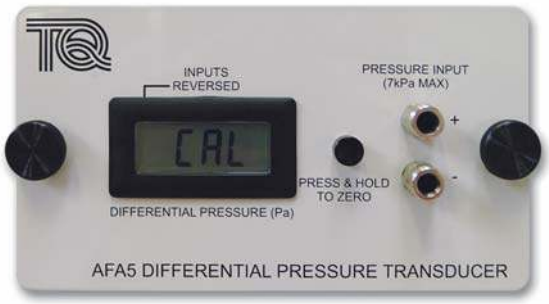
ALTERNATIVE PRODUCTS:

- Three-Component Balance (AF1300t) 45

DIFFERENTIAL PRESSURE TRANSDUCER VDAS® AFA5

Digital differential pressure measurement and display unit for use with the AF1300 Subsonic Wind Tunnel.

- Measures and displays differential pressures from models, Pitot static tubes and other devices
- Quicker, easier and more versatile than using liquid manometers
- Measures differential pressures or pressure with respect to atmosphere



The Differential Pressure Transducer and readout measures and displays pressures in Pitot static tubes and other pressure-sensing devices fitted to the AF1300 Subsonic Wind Tunnel, with respect to the atmosphere or differential pressures.

ANCILLARY FOR:

- Subsonic Wind Tunnel (AF1300) 41
- Cylinder Model (AF1300a) 43
- NACA 0012 Aerofoil Model with Tappings (AF1300b) 43
- 150 mm Chord NACA2412 Aerofoil with Variable Flap (AF1300c) 43
- Set of 2 NACA 0012 Aerofoils (AF1300d) 43
- Flat Plate Drag Model (AF1300e) 43
- Boundary Layer Model (AF1300f) 43
- Aircraft Model-Low Wing (AF1300g) 43
- Aircraft Model-High Wing (AF1300h) 43
- Three Dimensional Drag Models (AF1300j) 43
- S1210 Aerofoil (AF1300l) 43

ALTERNATIVE PRODUCTS:

- Multi-Tube Manometer (AFA1) 51
- 32-Way Pressure Display Unit (AFA6) 52

THREE-COMPONENT BALANCE VDAS® AF1300T

Measures lift, drag and pitching moment of models in the AF1300 Subsonic Wind Tunnel.

- Provides a convenient support system for models to measure the lift, drag and pitching moment
- Digital display shows lift, drag and pitching moment directly
- Fully adjustable for varying the angle of incidence to the direction of air flow

The Three-Component Balance provides an easy-to-use support system for wind tunnel models. It measures lift, drag and pitching moment exerted on the model.

RECOMMENDED ANCILLARIES:

- Balance Angle Feedback Unit (AFA4) 45

ANCILLARY FOR:

- Subsonic Wind Tunnel (AF1300) 41
- Cylinder Model with Pressure Tapping (AF1300a) 43
- 150 mm Chord NACA0012 Aerofoils (AF1300b) 43
- 150 mm Chord NACA2412 Aerofoil with Variable Flap (AF1300c) 42
- 100 mm Diameter Flat Plate (AF1300e) 43
- Aircraft Model - Low Wing (AF1300g) 43
- Aircraft Model - High Wing (AF1300h) 43
- Three-dimensional Drag Models (AF1300j) 43

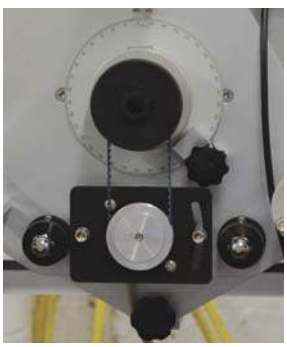
ALTERNATIVE PRODUCTS:

- Basic Lift and Drag Balance (AF1300z) 44

BALANCE ANGLE FEEDBACK UNIT VDAS® AFA4

Measures the angle positions of models mounted on the Three-Component Blance (AF1300T) and feeds the information directly to the Versatile Data Acquisitin System (VDAS®)

The Balance Angle Feedback Unit is an ancillary for use with TecQuipment's Three-Component Balance and VDAS® together to measure and record the angluar position of models mounted on the balance in TecQupment's subsonic wind tunnels.



ANCILLARY FOR:

- Three-Component Balance (AF1300t) 45

SMOKE GENERATOR AFA10

Allows the observation of air flow in subsonic wind tunnels and other air flow situations.

A smoke generator and probe that allows students to see air flow in subsonic wind tunnels and other low flow rate air flow products.

ANCILLARY FOR:

- Subsonic Wind Tunnel (AF1300) 41
- Flight Demonstration Wind Tunnel (AF41) 53

ALTERNATIVE PRODUCTS:

- Flow Visualisation (AF17) 37
- Flow Visualisation Wind Tunnel (AF80) 55

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MINIMUM INSTRUMENTS REQUIRED

MINIMUM INSTRUMENTATION REQUIRED IF NOT USING VDAS®			
This table shows the minimum additional instrumentation required if choosing not to use TecQuipment's VDAS®. **NOTE:** When using AF1300 without VDAS® all data recording must be done manually.	Basic Lift and Drag Balance (AF1300z) **OR** Three-Component Balance (AF1300t)	Three-Component Balance (AF1300t)	Multi-tube Manometer (AFA1)
Cylinder Model (AF1300a)	✓		
Set of Two NACA 0012 Aerofoils (AF1300d)	✓		
Flat Plate Drag Model (AF1300e)	✓		
Three-dimensional Drag Models (AF1300j)	✓		
S1210 Aerofoil (AF1300l)	✓		
NACA 0012 Aerofoil with Tappings (AF1300b)			✓
Boundary Layer Model (AF1300f)			✓
NACA 2412 Aerofoil with Flap (AF1300c)		✓	
Aircraft Model - Low Wing (AF1300g)		✓	
Aircraft Model - High Wing (AF1300h)		✓	

It is possible to complete all AF1300 experiments without using VDAS®. However, there is a minimum additional instrumentation requirement for some experiments.

All TecQuipment electronic instruments, e.g. the 32-Way Pressure Display Unit (AFA6), have visual displays from which data can be transcribed.

Other instruments, e.g. the Multi-tube Manometer (AFA1), are read manually and the data transcribed.

NOTE: The AF1300 is supplied with a standard Pitot tube, a Pitot static tube and a manometer (built into the control panel). Some or all of these instruments will be required, in addition to the optional instruments listed here, to complete the experiments.

SMOKE TRAIL AROUND THE LOW WING AIRCRAFT MODEL

MINIMUM INSTRUMENTATION REQUIRED IF USING VDAS®					
This table shows the additional instrumentation required if using VDAS®, making the most of its data collecting abilities. **NOTE:** When using VDAS® with the AF1300, data recording is quickly and accurately achieved directly onto a suitable computer. The data can then be downloaded into a suitable software package for further evaluation and presentation if required.	Differential Pressure Transducer (AFA5)	**EITHER** Basic Lift and Drag Balance (AF1300z) **OR** Three-Component Balance (AF1300t) **WITH** Balance Angle Feedback Unit (AFA4)	Pitot Static Traverse (AFA7)	32-Way pressure Display Unit (AFA6)	Three-Component Balance (AF1300t) **WITH** Balance Angle Feedback Unit (AFA4)
Cylinder Model (AF1300a)	2	✓	✓		
Set of Two NACA 0012 Aerofoils (AF1300d)	2	✓	✓		
Flat Plate Drag Model (AF1300e)	2	✓	✓		
Three-dimensional Drag Models (AF1300j)	2	✓	✓		
S1210 Aerofoil (AF1300l)	2	✓	✓		
NACA 0012 Aerofoil with Tappings (AF1300b)	2		✓	✓	
Boundary Layer Model (AF1300f)	✓			✓	
NACA 2412 Aerofoil with Flap (AF1300c)	2		✓		✓
Aircraft Model - Low Wing (AF1300g)	✓		✓		✓
Aircraft Model - High Wing (AF1300h)	✓		✓		✓