armfield

C SERIES

Computer Controlled Wind Tunnel – C30

Computer Controlled Wind Tunnel enables the user to carry out advanced studies in the Aerodynamics fields including boundary layer experiments, flow visualisation, pressure distribution, study of turbulence and offering the possibility of developing self-designed aerodynamic profiles to be tested.

The wind tunnel comprises outstanding features such as computer control, remote operation, datalogging and diagrams plotting in real time.

The system also benefits from clear visualisation of every model under test due to the architecture of the working section in a transparent material and the compact design of all components.

- Flow velocity up to 40m/s can be achieved
- Working section 310mm x 310mm x 660mm

COMPUTER CONTROLLED FRAME MOUNTED SUB SONIC WIND TUNNEL WITH 310mmX310mmX660mm WORKING SECTION CAPABLE OF 40M/S WIND SPEED

C-SMOKE - Probe Smoke Generator over models

Experimental content

Investigation of the development of the boundary layer on a flat plate by measurement of the total head distribution*

- Flow visualisation studies around an aerofoil
- Measurement of pressure distribution around an aerofoil at various angles of attack
- Measurement of pressure distribution around a cylinder
- Measurement of lift and drag on an aerofoil with leading edge slot and trailing edge flap
- Velocity and pressure distribution measurements using a Pitot static tube and yaw probe
- Measurement of drag for a selection of models of different shapes but common equatorial diameter
- Demonstration of flutter of an aerofoil
- Calibration of the wind tunnel velocity indicator using a Pitot static tube and inclined or electronic manometer
- Investigation of the wake behind a cylinder or aerofoil using a wake survey rake
- Demonstration of the boundary layer phenomena

*additional accessory required dependant on experiment

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Issue: 1
URL: http://www.armfield.co.uk/c30

Applications: ChE ME CE IP

Description

The C30-10 is a frame mounted wind tunnel, with transparent working section and a variable-speed fan for wind speed control. The operating range is nominally 0-40 m/s.

The tunnel is designed with an inlet flow straightener and contraction ratio to give laminar air flow through the working section.

Supplied with a transparent working section of 660mm (L) x 310mm (W) x 310mm (D) and a variable-speed fan for wind speed control.

Air is drawn in through the working section by a variable speed fan located at the discharge end of the tunnel.

The working section is 310 mm square and constructed from clear acrylic to give good visibility of the models in operation. The overall length of the working section is 660mm. Appropriate model / instrumentation mounting points are included in the side wall and roof of the working section.

The entire base of the working section is also removable to allow the insertion of large or complex models such as the C30-24 Bernoulli Apparatus, C30-25 Boundary Layer Plate or alternative models constructed by the user.

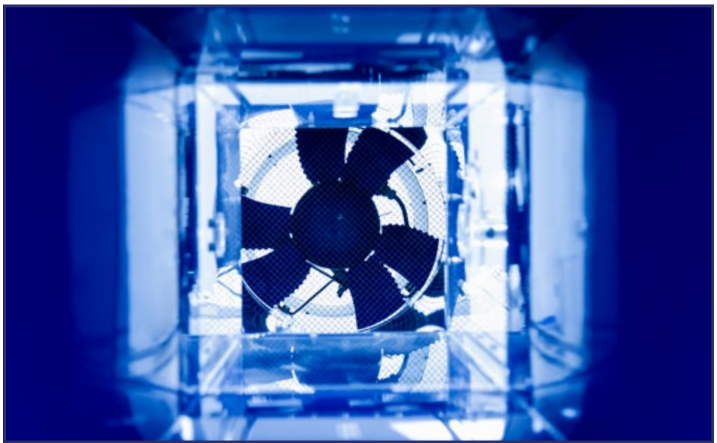
The available range of accessories is designed so that all the standard demonstrations of flow around bodies can be performed, including a visual indication of flow path as well as measurement of static and dynamic pressures, lift and drag.

The tunnel incorporates an Armfield IFD7 interface, which provides connection to a suitable PC. The supplied Armfield C30 software provides sensor output logging and fan control as well as performing any required calculations for each demonstration.

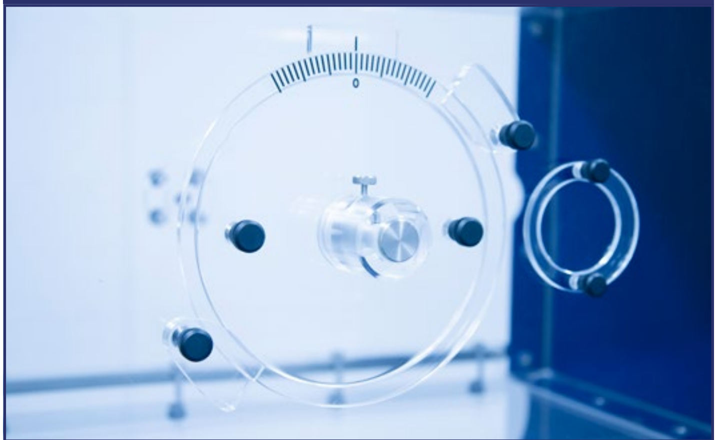
C-Smoke: Probe Smoke Generator

The probe smoke generator allows for easy visualisation of the air flow

Software supplied as standard



Variable speed fan, computer controlled upto 40m/s

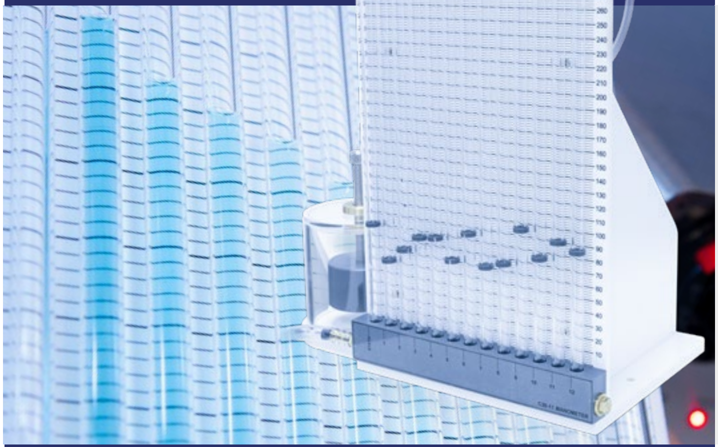


Instrumentation mounting points in the side wall and roof, with further model access via the floor

Aeroelastic flutter experiment (C30-34)

armSOFT computer control and realtime datalogging

C30-11: Manometer Bank



A bank of 13 transparent tubes positioned vertically to measure small pressure differences (0 – 320 mm H_2O) using water as the working fluid for safe operation and convenience in use.

The C30-11 manometer incorporates a water reservoir with a screw operated displacer to allow rapid adjustment of the datum level in the manometer. Any change in the level in one tube affects the level in all of the other tubes because they are connected to the common reservoir.

The manometer incorporates quick release connectors on the side for rapid connection to appropriate models and instruments.

C30-12: Electronic Manometer Bank

An electronic console incorporating 16 differential pressure sensors each with a range of 0-178 mm H_2O. The electrical supply for the manometer is obtained from the outlet socket on the front of the IFD7.

A common tapping ensures that all of the differential pressure sensors are referenced to atmospheric pressure. Quick release connectors (7 x single and 1 x 10-way) allow for rapid connection to models and instruments.

The electronic manometer connects to the control PC using a second USB port on the PC, and the readings are fully integrated with the wind tunnel control software for ease of use.

C30-13: Lift and Drag Balance (requires C30-20 or C30-22)

A two-component balance which measures the lift and drag forces on models mounted within the C30 wind tunnel. The balance mechanism enables test models to be mounted and held securely in position in the working section of the wind tunnel.

The incorporated hex support arm transmits the forces on the test model directly to the integrated load cells. The lift and drag balance can be manually adjusted through pitch angles of +/-45°.

C30-14: Pitot Static Tube (requires C30-11 or C30-12)

A miniature Pitot Static Tube mounted in a support plug that can be located in the roof of the working section at three alternative positions, i.e. the start of the working section and upstream and downstream of the model mounting position. The support plug incorporates an 'O' ring to retain the Pitot Tube where it is positioned and allows the tube to traverse over the full height of the working section to measure the velocity profile inside the working section of the tunnel.

The overall diameter of the Pitot Static Tube is 4 mm to give a stiff assembly without unduly disturbing the airflow downstream and the 'L' shaped arrangement, with the tip pointing into the flow, gives minimal disturbance at the point of measurement.

The two flexible tubes from the Pitot Static Tube incorporate a quick release connector that allows it to be connected to one of the optional manometers.

The Pitot Static tube is of Prandtl design and may be used with a negligible correction up to angles of yaw of at least 5 degrees.

C30-15: Wake Survey Rake (requires C30-11 or C30-12)

The rake consists of 10 stainless steel tubes positioned vertically in a row and pointing towards the airflow. The rake is mounted downstream of the model being used via the small access hatch in the side wall of the working section. The tubes are mounted at a fixed pitch of 11mm and are connected via flexible tubing to a multi-way quick release connector to suit the C30-11 or C30-12 manometers.

The rake is designed so that when mounted as described, the centre of the rake is aligned with the centre point or zero-angle centreline of models mounted through the large hatch. It will therefore cross the wake downstream of the model, allowing the pressure changes across the wake and therefore the changes in velocity to be measured.

When used with models such as the C30-21 Pressure Wing, readings can be taken from the pressure tapping's on the model and the Wake Survey Rake without changing any settings by simply swapping the quick release connector on the appropriate manometer.

C30-16-Asoft: 3-Component Balance-armSOFT

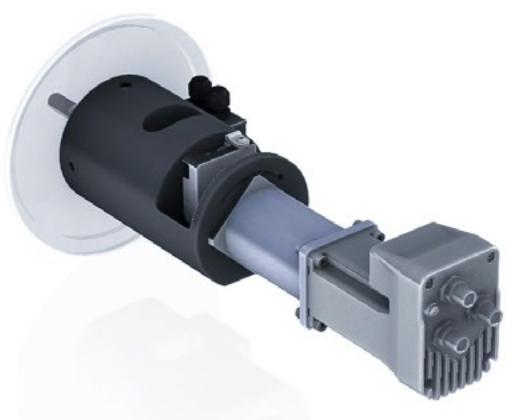
A 3-component balance used to measure lift, drag and moment forces on appropriate models. The models connect to the balance using a simple fixing that ensures correct orientation of the model.

The system is designed to work with a series of Armfield models and enables the user to manufacture and test their own 3D printed or fabricated wings to test and evaluate for project work.

Integrated electronic sensors are used to measure the lift, drag and moment forces.

The model being tested can also be rotated on the mounting and the angle of rotation measured electronically. The readings from the lift, drag, moment sensors and the rotation sensor are displayed on the control software screen running on the PC, and are available for data-logging.

C30-17-Asoft: 3-Component Driven Balance (Requires C30-19)



A PC controlled Driven 3-component balance incorporates a closed loop stepper drive for precise driven rotation angles particularly beneficial for remote operation/ remote learning activities and repetitious test and development.

*requires essential accessory C30-19

C30-20: Lift & Drag Aerofoil (requires C30-13)

A plain symmetrical aerofoil to NACA 0015 profile, incorporating a mounting rod that allows it to be installed on the C30-13 Lift & Drag Balance, thus allowing the lift and drag to be measured with the aerofoil at different angles of attack.

The aerofoil has the same section as the C30-21 Pressure Wing to allow direct comparison of lift characteristics with the pressure distribution.

C30-22 Drag Models (requires C30-13)

Eight different models are provided for use with the C30-13 Lift and Drag Balance for investigations into the influence of shape on the drag forces.

Five models are supplied with a common equatorial diameter of 50mm, thus all presenting the same cross section to the airflow: **Sphere - Hemisphere, convex to airflow - Hemisphere, concave to airflow - Circular disk - Streamlined shape.**

Additionally a dimpled golf ball and plain sphere demonstrate the difference in drag force due to the dimples.

C30-35 Car Model (Requires C30-44)

1:20th 3D printed scale model of a saloon car. It is easily mounted to the C30-44 Base Mount.

It can be used in conjunction with the C-SMOKE Probe Smoke Generator to visualise airflow over the car.

C30-36 Airbus A320 Airplane Model (requires C30-43)

1:140th 3D printed scale model of an Airbus A320. It is easily mounted to the C30-43 Manual Model Mount through the rear of the aircraft and can be actuated ± 45°.

It can be used in conjunction with the C-SMOKE Probe Smoke Generator to visualise airflow over the aircraft

C30-37 Airbus A380 Airplane Model (requires C30-43)

1:310th 3D printed scale model of an Airbus A380. It is easily mounted to the C30-43 Manual Model Mount through the rear of the aircraft and can be actuated ± 45°.

It can be used in conjunction with the C-SMOKE Probe Smoke Generator to visualise airflow over the aircraft

C30-38 Boeing 737 Airplane Model (requires C30-43)

1:135th 3D printed scale model of a Boeing 737. It is easily mounted to the C30-43 Manual Model Mount through the rear of the aircraft and can be actuated ± 45°. It can be used in conjunction with the C-SMOKE to visualise airflow over the aircraft at different angles of attack.

It can be used in conjunction with the C-SMOKE Probe Smoke Generator to visualise airflow over the aircraft

C30-39 Beech Bonanza A36 Airplane Model (requires C30-43)

1:40th 3D printed scale model of a Beechcraft Bonanza A36. It is easily mounted to the C30-43 Manual Model Mount through the rear of the aircraft and can be actuated ± 45°.

It can be used in conjunction with the C-SMOKE Probe Smoke Generator to visualise airflow over the aircraft

C30-40 F-16 Airplane Model (requires C30-43)

1:45th 3D printed scale model of a General Dynamics F-16 Fighting Falcon. It is easily mounted to the C30-43 Manual Model Mount through the rear of the aircraft and can be actuated ± 45°.

It can be used in conjunction with the C-SMOKE Probe Smoke Generator to visualise airflow over the aircraft

C30-30-01 to 04: C30 Wing Model
(requires C30-13 or C30-16/17)

Gottingen 535

NACA 633-618

NACA 64-212

Fauvel F2

Wing model designed with a **Gottingen 535 Air foil** profile, as used on a slingsby T21b glider. The high camber profile is designed into an air foil to maximise its lift coefficient.

Wing model designed with a **NACA 633-618** profile, as used on the Schleicher Ka6b Glider. The profile is less cambered than the Gottingen 535 allowing direct comparison.

Wing model designed with a **NACA 64-212** profile, as used on the MDM-1 Fox aerobatic glider. The profile is almost symmetrical and cuts through the air evenly.

Wing model designed with a **Fauvel F2** as used on the FV-36 Flying Wing. The profile is a reflexed camber air foil where the camber line curves back up near the trailing edge. Such an air foil is useful in certain situations such as with tailless aircraft.

C30-30-6: Wing Model (requires C30-13 or C30-16/17)

Wing model designed with an asymmetric **NACA 54118** profile.

C30-30-7: Wing Model (requires C30-13 or C30-16/17)

Wing model designed with a cambered **NACA 4415** air foil profile, as used on a Murphy JDM-8 ultralight aircraft.

C30-31 Aerofoil Model with Flap
(Requires C30-13 or C30-16/17)

The aerofoil is a **NACA 2412** which has an symmetrical section with adjustable flap of ± 90°. This adjustable flap allows students to investigate the effects of control surfaces such as flaps, ailerons, elevator or rudder.

When used in conjunction with the C30-16/17 3-Component Balance, students can study the effects of lift, drag and pitch moment when adjusting this flap.

Adjustment of the flap is controlled manually through a hatch on the opposite side of the wind tunnel.

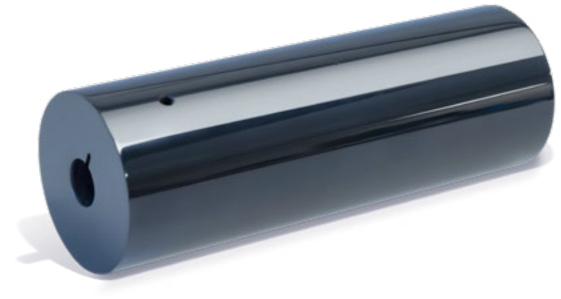
C30-42 Winglets Kit (Requires C30-13 or C30-16/17)

NACA 0015 symmetric wing profile

Wingtip devices (or winglets) are intended to improve the efficiency of fixed-wing aircraft by reducing drag. Although there are several types of wing tip devices which function differently, their intended effect is always to reduce an aircraft's drag by partial recovery of the tip vortex energy. These winglets can also improve aircraft handling characteristics by increasing the effective aspect ratio of a wing without greatly increasing the wingspan.

The winglets kit comes with five different winglet profiles: plain, raked winglet, car rear spoiler, wingtip fence and blended winglet. Each of these can be secured in turn, to the NACA 0015 symmetric wing profile and mounted to the C30-13 lift and drag or C30-16/17 three component balance.

C30-18-01 Cylinder With Pressure Tapping For 360º Drive
(requires C30-19)



Cylinder with single pressure tapping to interface with the driven 360-degree model unit enabling the study of pressure acting on a cylinder at various velocities and angular positions.

C30-23 Pressure Cylinder (requires C30-20 or C30-22)

A plain cylinder, 30mm diameter, incorporating 10 equi-spaced pressure tappings around half of the circumference that allow the pressure distribution around the cylinder to be measured.

The cylinder is mounted in the horizontal plane through the side of the working section and can be rotated through 180° to plot the pressure distribution over the whole circumference.

The tapping points are all flush with the surface of the cylinder and connected via flexible tubing to a multi-way quick release connector to suit the C30-11 or C30-12 manometers.

C30-21 Pressure Wing NACA 0015 (requires C30-11 or C30-12)

A symmetrical **NACA 0015** aerofoil incorporating 10 tapping points distributed around the wing profile that allow the pressure distribution to be measured from the leading edge to the trailing edge. The wing is mounted in the horizontal plane through the side of the working section, and the angle of attack is adjustable by rotating the circular hatch. Although only instrumented on one side, the effective pressure distribution on both surfaces can be obtained by inclining the aerofoil at positive and negative angles of attack.

The tapping points are all flush with the surface of the aerofoil and connected via flexible tubing to a multi-way quick release connector to suit the C30-11 or C30-12 manometers.

The **NACA 0015** is one of a standard series of aerofoils. The 00 indicates that the two faces are symmetrical. The 15 indicates that the aerofoil has a 15% thickness to chord (width) ratio, i.e. its thickness is 15% of its chord. This ratio is fairly typical for low-speed aerofoils, and possible applications include boat rudders as well as aircraft wings.

C30-32 Pressure Wing NACA 54118 Profile
(requires C30-11 or C30-12)

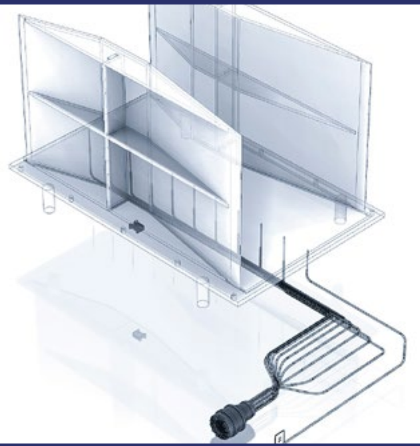
An asymmetric **NACA 54118** and **NACA 4415** aerofoil incorporating 16 tapping points distributed around the wing profile that allow the pressure distribution to be measured from the leading edge to the trailing edge.

The wing is mounted in the horizontal plane through the side of the working section, and the angle of attack is adjustable by rotating the circular hatch.

The tapping points are all flush with the surface of the aerofoil and connected via flexible tubing to a multi-way quick release connector and single quick release connectors to suit the C30-11 or C30-12 manometers.

C30-32 Pressure Wing NACA 4415 Profile
(requires C30-11 or C30-12)

C30-24 Bernoulli Apparatus (requires C30-11 or C30-12)



A Venturi profile that is installed in the working section of the tunnel via the removable floor. The Venturi incorporates 11 pressure tappings in the floor, connected via flexible tubing to quick release connectors to suit the C30-11 or C30-12 manometers.

The Venturi occupies the full height of the working section, and the width varies from full width at the inlet and outlet to 209mm at the throat. It is manufactured from clear acrylic for full visualisation.

By itself the C30-24 may be used to show the variation in static pressure with change in cross-section, but when used in conjunction with the Pitot Static Tube (C30-14) the Total Head and Static Head can also be measured at three locations allowing the local velocity to be measured and the Bernoulli equation to be fully demonstrated.

C30-25 Boundary Layer Plate (requires C30-11 or C30-12)

Note: Artificially roughened plate also included

A flat plate is mounted vertically in the working section via a removable floor panel incorporating a horizontal slot. A special flattened pitot tube mounted on a traversing micrometer allows the air velocity to be measured at different distances from the surface of the plate. The plate can be moved relative to the pitot tube to allow the velocity profile to be measured at any position between the leading edge and the trailing edge of the plate.

The special pitot tube (Total Head Tube) allows the average air velocity to be determined over a relatively small change in height by comparing the reading obtained with the static pressure reading in the working section.

A smooth plate and artificially roughened plate are included to show the difference between the development of laminar and turbulent boundary layers. The flexible tubing from the pitot tube incorporates a quick release connector to suit the C30-11 or C30-12 manometers.

C30-26 Project Kit

The Project Kit provides a range of mountings suitable for models of the students' own design.

These mountings are made to fit the working section, so that students may concentrate on the design of the model itself. The kit also includes a selection of suitable flexible tubing for connecting tapping points to sensors, and connectors for use with the optional manometers.

C30-34 Spring Mounted Wing Model

A symmetric aerofoil suspended on springs within a frame used to demonstrate the principle of wing flutter. Wing flutter is a dynamic instability of a flight vehicle associated with the interaction of aerodynamic, elastic and inertial forces.

The suspension positions of the wing, spring rate and centre of mass can be altered as well as the angle of attack +/-10°.

C30-18 Driven 360 Degree Model Unit (requires C30-19)

A PC controlled driven 360-degree model interface with single pressure tapping take off to allow test models to be fitted with incorporated pressure tapping.

Suitable for use with C30-18-01 Cylinder With Pressure Tapping For 360º Drive or for users to manufacture and test their own 3D printed or fabricated samples to test and evaluate for project work.

Particularly beneficial for remote operation/ remote learning activities and repetitious test and development.

**requires essential accessory C30-19*

C30-43 Manual Model Mount

The Manual Model Mount is to be used in conjunction with the airplane models to change the angle of attack of the aircraft whilst in operation.

The aircraft is secured onto the hex rod of the mount and rotates roughly around the centre of the aircraft wing. The manual mount is capable of actuating ±35° using the angle adjusment.

C30-44 Base Mount

A Base Mount used in conjunction with the C30-35 Car Model, also suitable for project work.

C30-11 Manometer Bank / C30-12 Electronic Manometer Bank

- To convert a head measurement using a manometer to an equivalent pressure reading
- To demonstrate the use of a static pressure reading to determine tunnel air velocity

C30-13 Lift and Drag Balance

- To measures the lift and drag forces (aerodynamic loads)

C30-14 Pitot Static Tube

- Static pressure, dynamic pressure and total pressure
- To demonstrate the difference between Static pressure, Dynamic pressure and Total pressure and how Dynamic pressure can be used to determine air velocity
- To show how velocity varies in the test section because of the velocity profile

C30-15 Wake Survey Rake

- Comparison of drag for shapes of equal equatorial diameter
- Visualisation of flow around different body shapes
- Measurement of the wake profile behind different shapes

C30-16 /17-Asoft 3-Component Balance - armSOFT

- To measure lift, drag and moment forces

C30-20 Lift and Drag Aerofoil

- Lift and Drag forces on a symmetrical aerofoil at different angles of attack
- To convert a head measurement using a manometer to an equivalent pressure reading
- To convert head and pressure readings to alternative engineering units
- To demonstrate the use of a static pressure reading to determine tunnel air velocity

C30-22 Drag Models

- Drag forces on bluff and streamlined bodies
- Comparison of drag for shapes of equal equatorial diameter
- Visualisation of flow around different body shapes
- Measurement of the wake profile behind different shapes (requires C30-15)

C30 Airplane Models, C30-35 Car Model

- Visualise airflow over various aircraft at different angles of attack
- Visualise airflow over a car

C30-30-01,02,03,04,06,07 Wing Models

- Lift, Drag and Moment forces on a aircraft wing at different angles of attack
- To convert a head measurement using a manometer to an equivalent pressure reading
- To convert head and pressure readings to alternative engineering units
- To demonstrate the use of a static pressure reading to determine tunnel air velocity
- C30-30-02 Wing Model Type 2 NACA 633-618 (Requires C30-13 or C30-16/17)

C30-31 Aerofoil Model with Flap (Requires C30-13 or C30-16/17)

- Effect of Lift, Drag and Moment forces on a aircraft wing with change of flap angle
- To investigate the effects of control surfaces such as flaps, ailerons, elevator, or rudder
- Influence of a flap

C30-42 Winglets Kit (Requires C30-13 or C30-16/17)

- Wing Theory
- Lift, Drag and Moment forces on a aircraft winglet at different angles of attack
- Observation of eddies on winglets

C30-23 Pressure Cylinder), C30-18-01 Cylinder with Pressure Tapping for 360º Drive

- Flow around a cylinder
- To investigate the variation in Static Head resulting from a change in cross-section area
- The measurement of pressure distribution around a circular cylinder at different velocities (and Reynolds Number)

C30-21 Pressure Wing NACA 0015, C30-32 Pressure Wing NACA 54118 Profile, C30-33 Pressure Wing NACA 4415 Profile

- Flow and pressure distribution around a symmetrical aerofoil at different angles of attack
- To investigate the pressure distribution across the wake behind the wing

C30-24 Bernoulli Apparatus (requires C30-11or C30-12)

- Effect of change in cross-section and application of Bernoulli equation
- To investigate the variation in Static Head resulting from a change in cross-sectional area
- To investigate the Bernoulli equation (if C30-14 Pitot Static Tube is also available)

C30-25 Boundary Layer Plate (requires C30-11or C30-12)

- Laminar and Turbulent Boundary Layer Development
- To measure the depth of the boundary layer on smooth and rough flat plates

C30-34 Spring Mounted Wing Model

- Aeroelastic Flutter

C-SMOKE Probe Smoke Generator

Technical specifications

- A stand-alone subsonic wind tunnel for conducting experiments in aerodynamics
- The wind tunnel is mounted on a steel base on wheels for mobility
- Clear Acrylic working section of 310mm by 310mm and 660mm long
- The unit operates as an open circuit system
- Inverter controlled AC suction fan to drag the air flow through the working section
- Accurate speed control up to 40m/s
- The duct incorporates a honeycomb flow straightener to achieve laminar flow
- The working section incorporates three tapping's on its top section to incorporate pitot tubes. These are located at the start of the working section, upstream and downstream of the model under test location
- A honeycomb type flow straightener and a 9:4:1 contraction ratio ensure laminar air flow through the working section.
- An electronic pressure sensor mounted in a tapping through the side wall at the rear of the working section measures the static pressure inside the working section, allowing the instantaneous air velocity to be calculated and displayed on the computer
- The working section incorporates a simple technique for flow visualisation around any of the optional models.
- Optional models are mounted through a circular opening, 160mm diameter, in the front wall of the working section. These models are permanently mounted on a hatch cover to seal the opening (flush with the inside wall of the working section to avoid disturbing the air flow). The hatch cover is secured by quick release clamps on the side wall of the working section allowing rapid change from one model to another. Where necessary the hatches incorporate an angular scale allowing the model to be manually rotated to known angles.
- A second, smaller hatch behind the model mounting position allows the optional Wake Survey Rake to be installed downstream of the various optional models.

Linear Speed	0-40m/s
Working Section	**Length:** 660mm
	Width: 310mm
	Height: 310mm
Axial Fan Power	Approx. 4kW
Fan Turning Speed	3000rpm
Measuring Ranges	**Manometer:** 0-250mm H^{2}0
	Wind speed: 0-40m/s
	Angle of inclination: +/- 180°
	Lift force: +/- 10N
	Drag force: +/- 10N
	Pitching moment: +/- 3N

Overall dimensions

Dimensions	
Length	3.835m
Width	0.990m
Height	1.860m
Packed and crated shipping specifications (for 2 cases)	
Volume	7.9m^3
Gross weight	655kg

Software

The wind tunnel incorporates a software package as standard including the following features:

- Diagram of the unit with all the sensors allocated across the diagram
- Graph plotting menu enabling data to be represented graphically in real times
- "Insert Comment" feature for operation conditions change registration
- Access to electronic version of the manual at all time
- Calibration screens to enable adjustment of individual sensor scaling
- USB data interface, which can connect to a PC running Windows 7 or above
- Multi-lingual interface
- Remote control operation available

Requirements

PC | USB

Scale

Electrical supply:

- **C30-10-C:** 400V/3ph/50Hz
- **C30-10-D:** 208-220V/3ph/60Hz/32A

The user must have a PC with 2 x USB ports, running Windows 7 above

Ordering codes

C30-10-C: Computer Controlled Wind Tunnel
C30-10-D: Computer Controlled Wind Tunnel
C30-11: Manometer Bank
C30-12: Electronic Manometer Bank
C30-13: Lift and Drag Balance (requires C30-20 or C30-22)
C30-14: Pitot Static Tube (requires C30-11 or C30-12)
C30-15: Wake Survey Rake (requires C30-11 or C30-12)
C30-16-Asoft: 3-Component Balance - Armsoft
C30-17-Asoft: 3-Component Driven Balance - Armsoft (requires C30-19)
C30-18: Driven 360 Degree Model Unit (requires C30-19)
C30-18-01: Cylinder with Pressure Tapping for 360 deg drive (requires C30-19)
C30-19: Wind Tunnel Accessory PSU
C30-20: Lift & Drag Aerofoil (Requires C30-13 or C30-16/17)
C30-21: Pressure Wing (requires C30-11 or C30-12)
C30-22: Drag Models (Requires C30-13 or C30-16/17)
C30-23: Pressure Cylinder (requires C30-20 or C30-22)
C30-24: Bernoulli Apparatus (requires C30-11 or C30-12)
C30-25: Boundary Layer Plate (requires C30-11 or C30-12)
C30-26: Project Kit
C30-30-01: Wing Model 1 Gottingen 535 (Requires C30-13 or C30-16/17)
C30-30-02: Wing Model 2 NACA 633-618 (Requires C30-13 or C30-16/17)
C30-30-03: Wing Model 3 NACA 64-212 (Requires C30-13 or C30-16/17)
C30-30-04: Wing Model 4-Fauvel F2 (Requires C30-13 or C30-16/17)
C30-30-06: Wing Model NACA 54118 Profile (Requires C30-13 or C30-16/17)
C30-30-07: Wing Model NACA 4415 Profile (Requires C30-13 or C30-16/17)
C30-31: Aerofoil Model with Flap (Requires C30-13 or C30-16/17)
C30-32: Pressure Wing NACA 54118 Profile (requires C30-11 or C30-12)
C30-33: Pressure Wing NACA 4415 Profile (requires C30-11 or C30-12)
C30-34: Spring Mounted Wing Model
C30-35: Car Model (Requires C30-44)
C30-36: Airbus A320 Airplane Model (requires C30-43)
C30-37: Airbus A380 Airplane Model(requires C30-43)
C30-38: Boeing 737 Airplane Model (requires C30-43)
C30-39: Beech Bonanza A36 Airplane Model requires C30-43)
C30-40: F16 Airplane Model (requires C30-43)
C30-42: Winglets Kit (Requires C30-13 or C30-16/17)
C30-43: Manual Model Mount
C30-44: Base Mount
C-SMOKE-A or B: Probe Smoke Generator

Armfield standard warranty applies with this product