PRODUCT PORTFOLIO

ENGINEERING EXCELLENCE IN EDUCATION

TECQUIPMENT

ISSUE 2

TECQUIPMENT.COM

WELCOME TO THE TECQUIPMENT PRODUCT PORTFOLIO

With the digital version you will notice links to **VIDEOS** to watch, **DATASHEETS** to view, ancillary **FLYERS** to download and more **INTERACTIVE** content to make your research into TecQuipment's teaching apparatus quick and easy.

INTERACTIVE DIGITAL VERSION

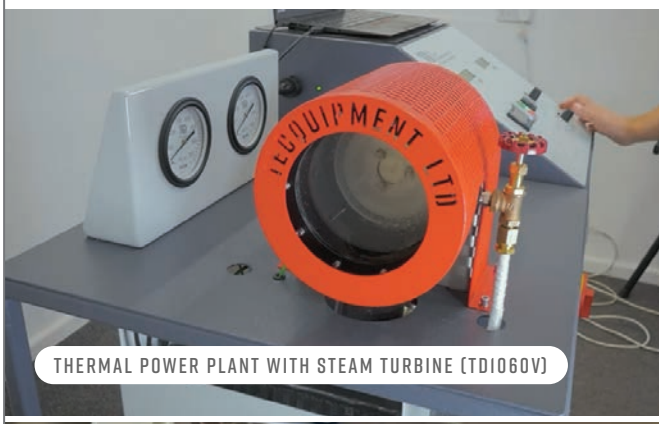
If you have any questions please either contact us directly by emailing **sales@tecquipment.com** or contact your local TecQuipment Sales Partner who can be found on the website at **tecquipment.com/sales-partners**.

AF1300 AIRFOIL IN PLACE THROUGH AIR STRAIGHTENER

CONTENTS

PLAY NOW - TECQUIPMENT YOUTUBE CHANNEL

Visit and subscribe to the TecQuipment YouTube channel for all the latest products showcases, installation and user videos: **YOUTUBE.COM/@TECQUIPMENT/VIDEOS**

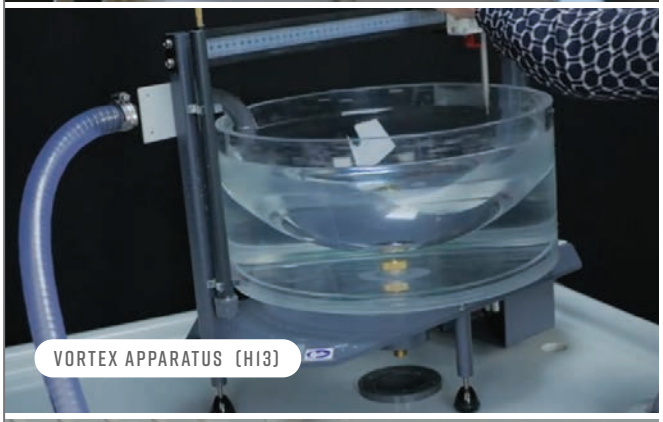


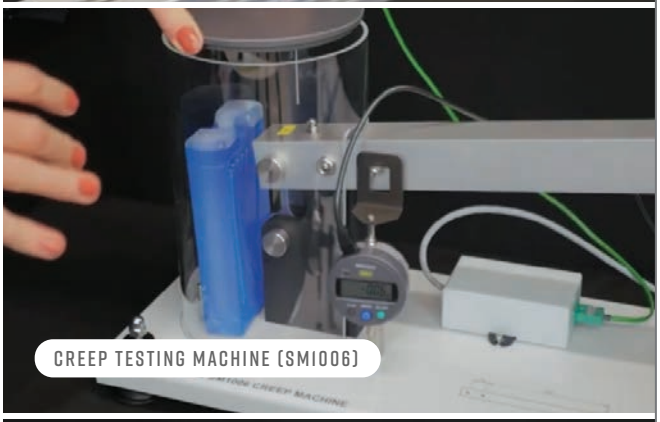
THERMAL POWER PLANT WITH STEAM TURBINE (TD1060V)


HYDRO-ELECTRIC TURBINE (AE1000V)

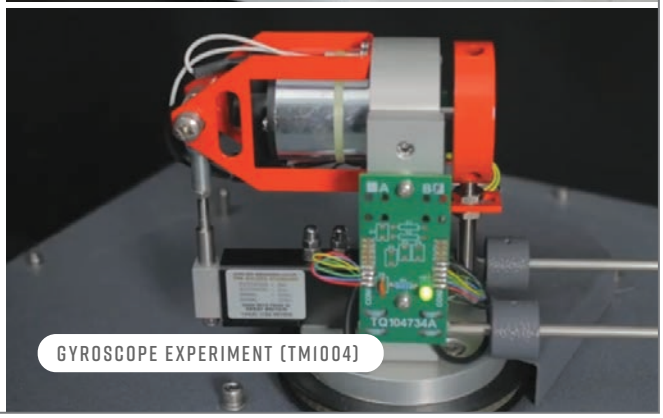

FLOW VISUALISATION WIND TUNNEL (AF80)


SHEAR FORCE IN A BEAM (STS3)


VORTEX APPARATUS (H13)


CREEP TESTING MACHINE (SM1006)


FRICTION AND INCLINED PLANE KIT (ES8)


GYROSCOPE EXPERIMENT (TM1004)

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ENGINEERING SCIENCE

PACKAGES AND FRAME
SMART WORKSHEETS
FORCES AND MOMENTS
MATERIALS TESTING
VIBRATION, FRICTION AND ENERGY
SIMPLE MACHINES
MECHANISMS

ENGINEERING SCIENCE FULL SET ESF

A complete set of TecQuipment's Engineering Science kits and three work panels within a mobile trolley.

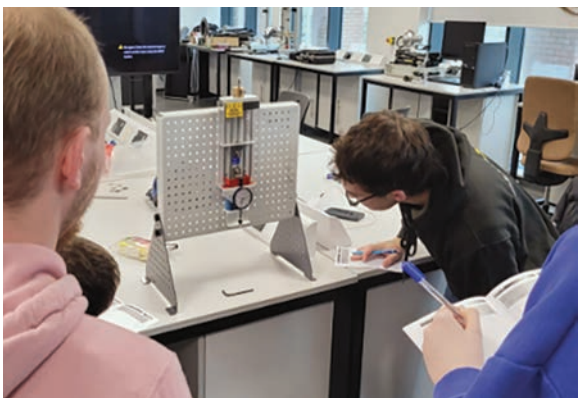
WORK PANEL ESI

Multi-position work panel for use with TecQuipment's Engineering Science kits.

ESSENTIAL BASE UNIT (ESI)

EXPERIMENT KITS
(ES2-ES19)

EXPERIMENT KITS POSTER



AVAILABLE EXPERIMENT KITS:

PACKAGES

As well as the full set, these packages are also available which offer great value for money.

FORCES AND MOMENTS KIT PACKAGE ESB1

TWO WORK PANELS ES1

+

- FORCES KIT ES2
- MOMENTS KIT ES3

MATERIALS TESTING KIT PACKAGE ESB2

FOUR WORK PANELS ES1

+

- DEFLECTION OF BEAMS AND CANTILEVERS KIT ES4
- TORSION OF CIRCULAR SECTIONS KIT ES5
- TENSILE TESTER KIT ES6
- SPRING TESTER KIT ES19

SIMPLE MACHINES KIT PACKAGE ESB3

FOUR WORK PANELS ES1

+

- PULLEY KIT ES10
- DRIVE SYSTEMS KIT ES11
- GEAR TRAINS KIT ES13
- CENTRIFUGAL FORCE KIT ES16

MECHANISMS KIT PACKAGE ESB4

FOUR WORK PANELS ES1

+

- CAM, CRANK AND TOGGLE KIT ES12
- SIMPLE MECHANISMS KIT ES14
- BAR LINKAGES KIT ES15
- ADDITIONAL MECHANISMS KIT ES18

VIBRATION, FRICTION AND ENERGY KIT PACKAGE ESB5

FOUR WORK PANELS ES1

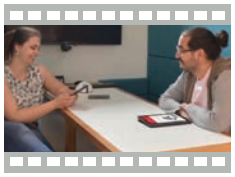
+

- SIMPLE HARMONIC MOTION KIT ES7
- FRICTION AND INCLINED PLANE KIT ES8
- POTENTIAL AND KINETIC ENERGY KIT ES9
- ROTATIONAL FRICTION KIT ES17

SMART WORKSHEETS ESSW

ESSW

Enhancing teaching capabilities and complementing students' learning with the use of ready-made, online and auto-graded assessments that are compatible with selected experiment kits in the Engineering Science range.



Worksheets currently available:

FORCES AND MOMENTS (ES2 and ES3):
- Centre of Gravity
- Triangle of Forces
- Principle of Moments
- Levers

DEFLECTION OF BEAMS (ES4):
- Beam Load
- Beam Dimensions
- Beam Length

TORSION (ES5):
- Torque and Diameter

STRENGTH OF MATERIALS (ES6):
- Tensile Testing

DRIVE SYSTEMS (ES11 and ES13):
- Chain Drive
- Belt Drive
- Spur Gears

SIMPLE MECHANISMS (ES14):
- Crank and Slider

FORCES KIT ES2 ESSW

Demonstrates how to find the centre of gravity of shapes and the relationship between angles and coplanar forces, using force triangles.

MOMENTS KIT

ES3 ESSW

Demonstrates the relationship between distances and forces in rigid beams and levers showing the first, second and third order levers.

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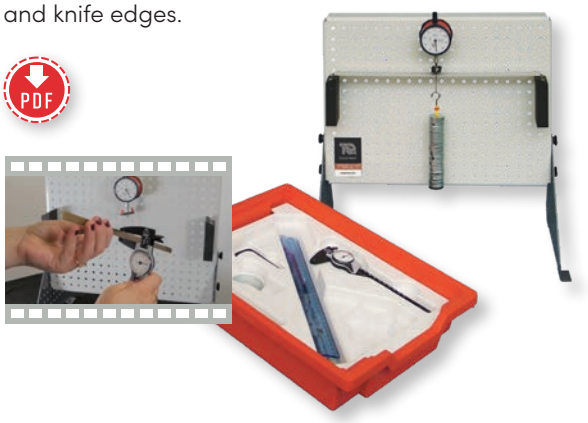
DEFLECTION OF BEAMS AND CANTILEVERS KIT ES4 ESSW

Demonstrates the deflection of beams of different materials and dimensions, held on different supports, both clamps and knife edges.

PDF



TORSION OF CIRCULAR SECTIONS KIT ES5 ESSW

Demonstrates the torsion in circular section specimens of different materials and lengths.

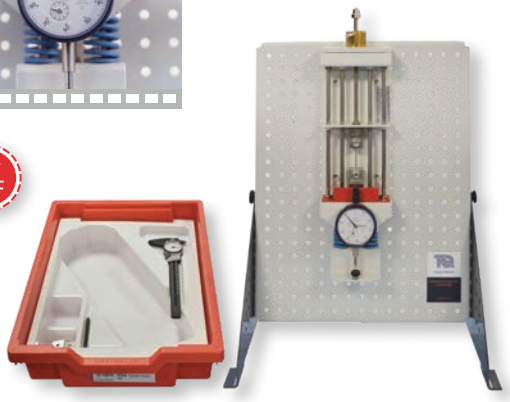
PDF

TENSILE TESTER KIT

ES6 ESSW

Demonstrates the principles of tensile tests on specimens of different materials, showing material behaviour in the elastic and plastic region (Young's modulus).

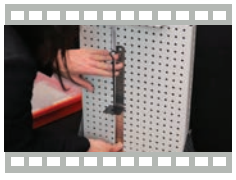
PDF



SIMPLE HARMONIC MOTION KIT ES7

Demonstrates simple harmonic motion (oscillation) in springs and pendulums, and its usefulness.

PDF

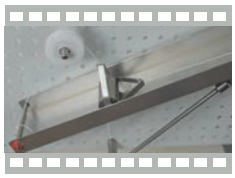


SIMPLE HARMONIC MOTION EXPERIMENT

FRICTION AND INCLINED PLANE KIT ES8

Demonstrates kinetic and static sliding friction and rolling friction on bodies and between different surfaces on a flat or inclined plane.

PDF

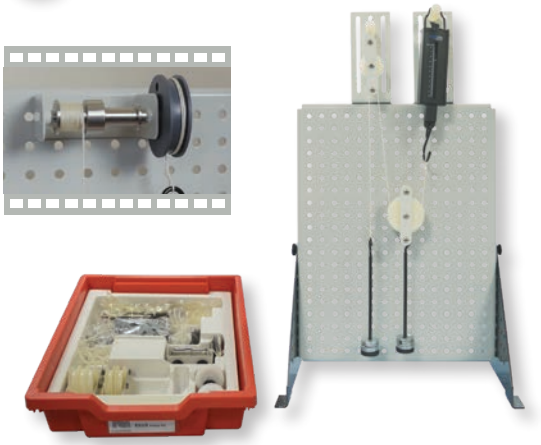


POTENTIAL AND KINETIC ENERGY KIT ES9

Demonstrates the difference between potential and kinetic energy and how it can change from one to the other using a pendulum or flywheel. Also demonstrates elastic potential energy in a spring.

PULLEY KIT ES10

Demonstrates the mechanical advantage of different combinations of pulleys and a simple wheel and axle.



DRIVE SYSTEMS KIT ES11 ESSW

Demonstrates the advantages and disadvantages of three popular drive systems (belt, chain and a universal coupling) using a manually rotated frame with a low-friction cantilever linkage, adjustable masses and a spring to apply force.

CAM, CRANK AND TOGGLE KIT ES12

Demonstrates the characteristics of a mechanical toggle, crank motion and the most popular shaped cams: pear, heart, round and snail.

GEAR TRAINS KIT ES13 ESSW

Demonstrates the characteristics of a spur gear, bevel gear and a worm drive.

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SIMPLE MECHANISMS KIT

ES14 ESSW

Demonstrates how the Scotch yoke, crank and slider and quick return mechanisms convert motion.

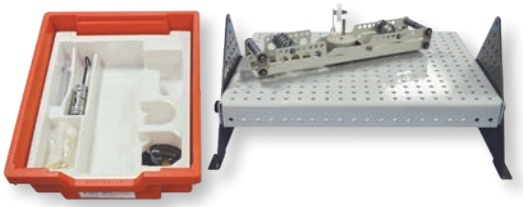
PDF

CENTRIFUGAL FORCE KIT

ES16

Demonstrates the relationship between centrifugal force, radius and velocity of rotating masses.

PDF



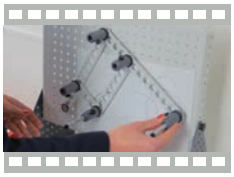
ADDITIONAL MECHANISMS KIT ES18

Demonstrates how the Geneva mechanism and a ratchet mechanism convert motion.

PDF

BAR LINKAGES KIT ES15

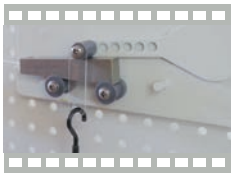
A set of bars and pivot joints for students to understand different bar linkages and mechanisms.



PDF

ROTATIONAL FRICTION KIT ES17

Demonstrates how rotational friction affects the efficiency of popular machine elements, including a screw jack, wedge and different bearings.



PDF

SPRING TESTER KIT ES19

Demonstrates the characteristics of coiled springs and how to test them (Hooke's law).

PDF

AERODYNAMICS

SUBSONIC WIND TUNNELS

SPECIAL PURPOSE WIND TUNNELS

SUPERSONIC NOZZLE

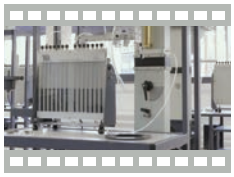
SUPERSONIC WIND TUNNELS

MODULAR AIR FLOW BENCH AF10

This is a small-scale wind tunnel with an electric fan and adjustable air flow control, with eight different experiment modules that demonstrate key principles and phenomena of air flow.

PDF

EXPERIMENT MODULES POSTER



ESSENTIAL BASE UNIT
(AF10)

EXPERIMENT MODULES
(AF11-AF18)

AVAILABLE EXPERIMENT MODULES:

BERNOULLI'S EQUATION AF11

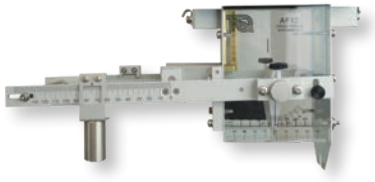
Allows students to measure the pressure distribution in a convergent-divergent duct to confirm Bernouli's equation.

PDF

DRAG FORCE AF12

Allows students to investigate the direct and indirect measurement of drag on various shapes and to calculate and analyse the drag coefficient by different methods.

PDF



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ROUND TURBULENT JET AF13

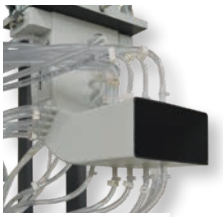
Allows students to investigate a jet of air as it emerges from the end of a tube and analyse its properties.

BOUNDARY LAYER AF14

Allows students to investigate both the laminar and turbulent boundary layers on flat plates with rough and smooth surfaces.

FLOW AROUND A BEND AF15

Allows students to measure the pressure distribution in a smooth rectangular bend via tapping points on the curved walls and radius.

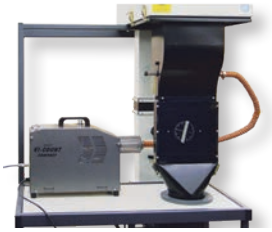


COANDĂ EFFECT AND JET FLOW AF16

Allows students to investigate the Coandă effect and a fluidic flip-flop.

FLOW VISUALISATION AF17

Allows students to 'see' the air flow around various shapes by using smoke filaments. The shapes are viewed through a transparent window.



TAPPED AEROFOIL AF18

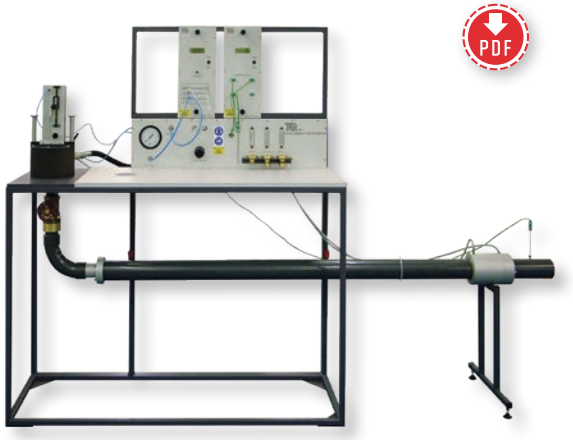
Allows students to investigate the pressure distribution around a two-dimensional NACA aerofoil that has 12 tapping points along the chord.

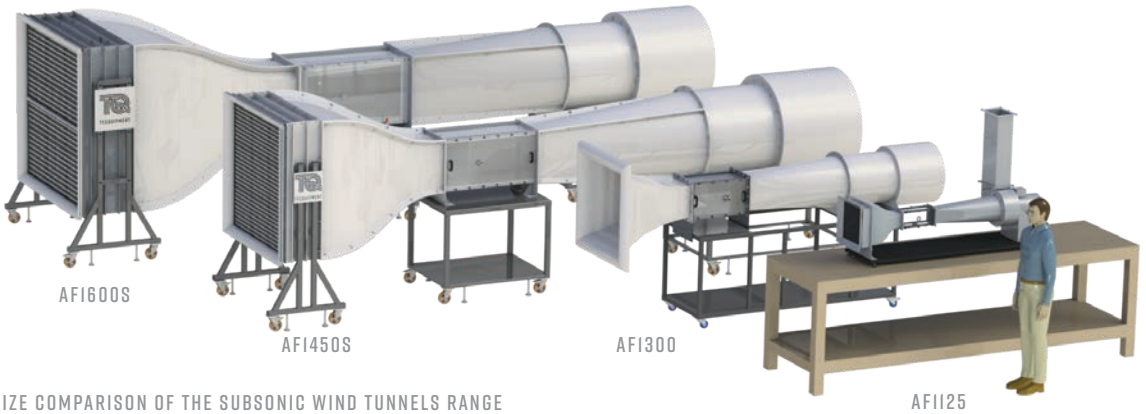
FLOW VISUALISATION WIND TUNNEL AF80

A vertical suction-type wind tunnel that uses smoke trails to demonstrate air flow around differently shaped models, for understanding boundary layers, separation and rotational flow.

LAVAL NOZZLE FLOW APPARATUS AF27 VDAS®

Demonstrates the thermodynamic and fluid mechanics of the adiabatic expansion of air through subsonic and supersonic nozzles. Includes interchangeable convergent, convergent/divergent Laval nozzles and convergent/parallel nozzle.

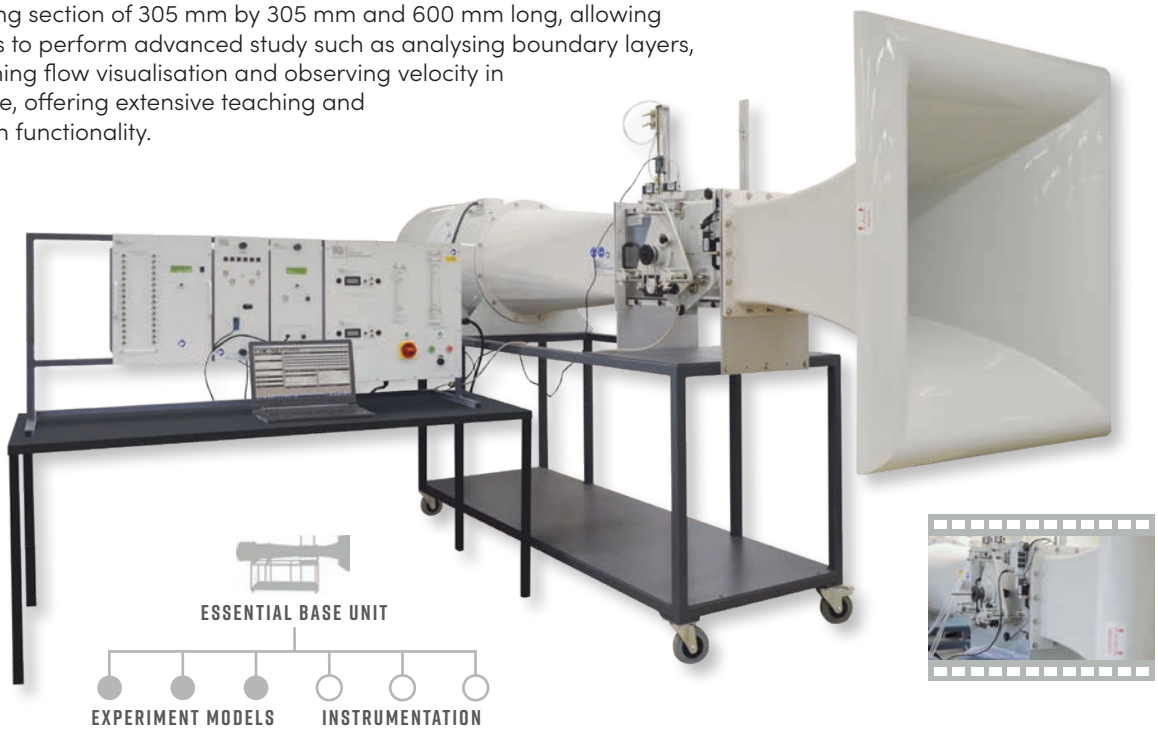




SIZE COMPARISON OF THE SUBSONIC WIND TUNNELS RANGE

SUBSONIC WIND TUNNEL 305 MM AF1300 VDAS®

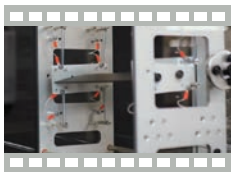
A compact, free-standing, open-circuit suction subsonic wind tunnel with a working section of 305 mm by 305 mm and 600 mm long, allowing students to perform advanced study such as analysing boundary layers, performing flow visualisation and observing velocity in the wake, offering extensive teaching and research functionality.



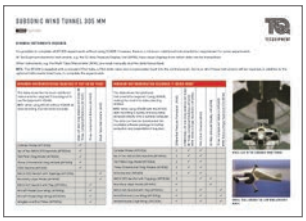
EXPERIMENT MODELS:

- Cylinder Model with Tapping (AF1300a)
- NACA 0012 Aerofoil with Tappings (AF1300b)
- NACA 2412 Aerofoil with Flap (AF1300c)
- Set of Two NACA 0012 Aerofoils (AF1300d)
- Flat Plate Drag Model (AF1300e)
- Boundary Layer Model (AF1300f)
- Aircraft Model (Low Wing) (AF1300g)
- Aircraft Model (High Wing) (AF1300h)
- Three-Dimensional Drag Models (AF1300j)
- S1210 Aerofoil (AF1300l)
- Winglets and End Plates (AF1300q)
- Flutter Wing (AF1300r)

WINGLETS AND END PLATES



FLUTTER WING



INSTRUMENTATION REQUIREMENT CHART

MODELS AND INSTRUMENTATION POSTERS

A starter set is available consisting of the Subsonic Wind Tunnel 305 mm (AF1300), Basic Lift and Drag Balance (AF1300z) and a set of Three-Dimensional Drag Models (AF1300j).

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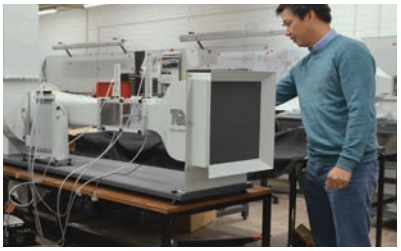
BENCHTOP SUBSONIC WIND TUNNEL AF1125

An ultra-compact, open circuit, benchtop subsonic wind tunnel that offers a complete system ready for aerodynamic experimentation, suitable for college use, undergraduate study and research projects.



SUBSONIC WIND TUNNEL 450 MM AF1450S VDAS®

Larger open-circuit, suction subsonic wind tunnels for the study of advanced aerodynamics theory and research. With a working section of 450 mm or 600 mm comes greater visualisation and more accurate results, operating at meaningful Reynolds numbers.

MODELS AND INSTRUMENTATION POSTERS

FULLY OPERATION WIND TUNNEL

SUBSONIC WIND TUNNEL 600 MM AF1600S VDAS®

Larger open-circuit, suction subsonic wind tunnels for the study of advanced aerodynamics theory and research. With a working section of 450 mm or 600 mm comes greater visualisation and more accurate results, operating at meaningful Reynolds numbers.

MODELS AND INSTRUMENTATION POSTERS

FLIGHT DEMONSTRATION WIND TUNNEL AF41V VDAS® ONBOARD

PDF

A model aircraft suspended in an open circuit wind tunnel. Includes realistic fly-by-wire flight controls to simulate a variety of principles of aircraft flight.

INTERMITTENT SUPERSONIC WIND TUNNEL AF300 VDAS®

An intermittent supersonic (up to Mach 1.8) wind tunnel for investigations into subsonic and supersonic air flow around two-dimensional models. Also for analysis of the profile of the tunnel working section.

PDF

CONTINUOUS SUPERSONIC WIND TUNNEL AF302 VDAS®

PDF

A suction-type, continuous-operation supersonic (up to Mach 1.8) wind tunnel for investigations into subsonic and supersonic air flow around two-dimensional models. Also for analysis of the profile of the tunnel working section.

SCHLIEREN APPARATUS AF300A / AF302A

The Schlieren apparatus enables students to see air flow (including supersonic shock waves) around two-dimensional models as variations in the intensity of illumination. For use with the Intermittent (AF300) and Continuous (AF302) Supersonic Wind Tunnels.

PDF

5 DEGREES MACH 1-8 AND 5 DEGREE WEDGE

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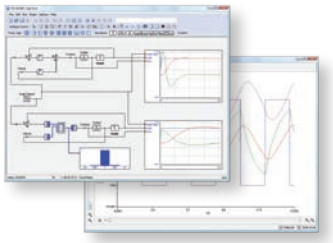
CONTROL ENGINEERING

CONTROL SOFTWARE CE2000

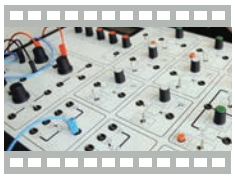
Software that simulates control systems and works with TecQuipment's controller (CE120) or digital interface (CE122) to control and acquire data from TecQuipment's Control Engineering range.



CONTROLLER

CE120

A self-contained analogue and computer-based controller designed to support practical investigations into the basic and advanced principles of control engineering at all academic levels.



EXPERIMENT MODULES POSTER

ESSENTIAL BASE UNITS
(CE120 OR CE122)

EXPERIMENT MODULES
(CE103, CE105-CE110)

DIGITAL INTERFACE CE122

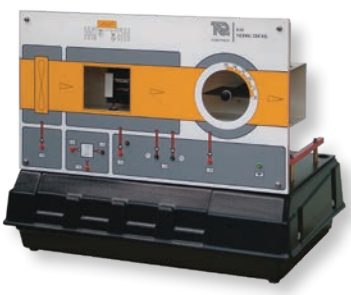
A self-contained computer-based controller designed to support practical investigations, covering the basic and advanced principles of control engineering at all academic levels.

AVAILABLE EXPERIMENT MODULES:

- Thermal Control Process Apparatus (CE103) 13
- Coupled Tanks Apparatus (CE105/CE105MV) 14
- Ball and Beam Apparatus (CE106) 13
- Engine Speed Control Apparatus (CE107) 14
- Coupled Drives Apparatus (CE108) 14
- Ball and Hoop Apparatus (CE109) 14
- Servo Trainer (CE110) 14

THERMAL CONTROL PROCESS APPARATUS CE103

A self-contained benchtop temperature control apparatus that mimics common industrial processes, designed to allow students at all academic levels to investigate the basic and advanced principles of control.



BALL AND BEAM APPARATUS

CE106

A self-contained benchtop apparatus to demonstrate basic and advanced principles of control in naturally unstable systems.

COUPLED TANKS APPARATUS CE105

A self-contained benchtop apparatus to demonstrate basic and advanced principles of control of single and coupled tanks, including the study of static and dynamic systems.

PDF

MULTIVARIABLE COUPLED TANKS APPARATUS

CE105MV

Based on the CE105 but features a second pump and flow metre for more advanced experiments on the principles of multivariable control.

ENGINE SPEED CONTROL APPARATUS CE107

A self-contained benchtop apparatus to demonstrate basic and advanced principles of engine speed control, including non-linear systems and inner loop feedback techniques.

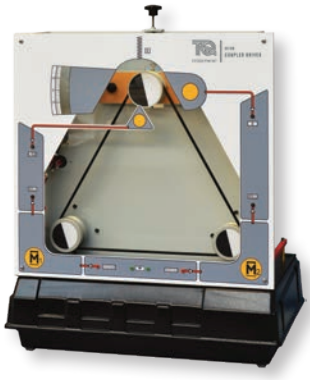
PDF

COUPLED DRIVES APPARATUS

CE108

Compact benchtop apparatus designed to allow students at all academic levels to investigate basic and advanced principles of control, including control of multi-variable systems.

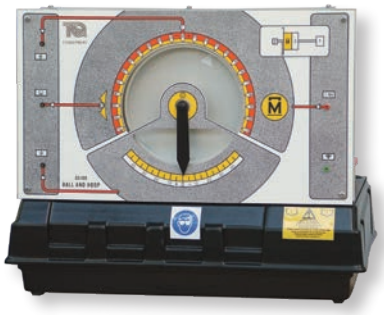
PDF



BALL AND HOOP APPARATUS CE109

A self-contained benchtop apparatus to demonstrate basic control of position or speed of a ball in a hoop, and more advanced studies of liquid slop.

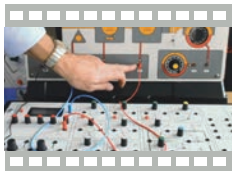
PDF



SERVO TRAINER CE110

A self-contained benchtop DC servo apparatus to study basic control of speed of a servomotor, through to more advanced optional controllers or other suitable controllers.

PDF



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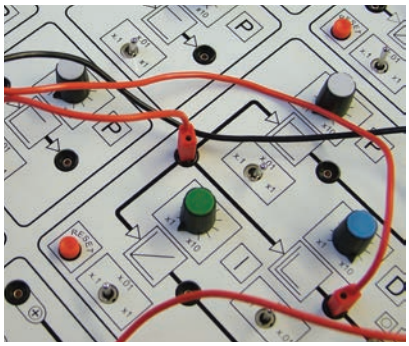
PROCESS CONTROL ENGINEERING

DIGITAL CONTROL

PROCESS CONTROL

PLC TRAINER CE123

Uses an industry-standard PLC to control the PLC process using ladder logic programming running on a PC. For use with the PLC Process (CE111).

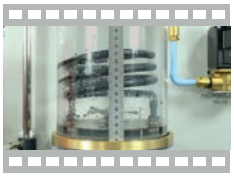


PLC PROCESS CE111

A self-contained, benchtop liquid flow and level process, providing a physical system to experience the programming of programmable logic controllers, for use with the PLC Trainer (CE123).

PROCESS TRAINER CE117

A self-contained, benchtop, fully integrated teaching apparatus that mimics industrial process engineering, including a comprehensive range of experiments in flow, level, pressure and temperature, ranging from basic theories through to more advanced principles.



PRESSURE PROCESS TRAINING SYSTEM TE3300/02

A self-contained, mobile module using pressure as the control variable to illustrate the principles of single-loop control and the calibration and tuning of controllers, transmitters, converters and valves.

FLOW PROCESS TRAINING SYSTEM

TE3300/03

A self-contained, mobile module for flow process control experiments to illustrate the principles of single-loop control and the calibration and tuning of controllers, transmitters, converters and valves.

LEVEL PROCESS TRAINING SYSTEM TE3300/04

A self-contained, mobile module for level process control experiments to illustrate the principles of single-loop control and the calibration and tuning of controllers, transmitters, converters and valves.

TEMPERATURE PROCESS TRAINING SYSTEM TE3300/05

A self-contained, mobile module for temperature process control experiments to illustrate the principles of single-loop control and the calibration and tuning of controllers, transmitters, converters and valves.

COMPUTER CONTROL SYSTEM TE3300/06

Easy-to-use software that connects to the TE3300 Process Control modules for remote control and monitoring of processes (distributed control).

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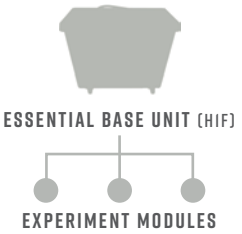
FLUID MECHANICS

DIGITAL HYDRAULIC BENCH
FLOW AND PRESSURE MEASUREMENT
PIPE FRICTION AND ENERGY LOSS
LAMINAR AND TURBULENT FLOW
NOZZLES AND JETS
VORTICES AND CAVITATION
PIPE SURGE AND WATER HAMMER
OPEN CHANNEL FLOW
HYDROSTATICS AND PROPERTIES OF FLUIDS
HYDROLOGY
PUMPS AND TURBINES
MODULAR FLUID POWER (PUMPS, TURBINES AND COMPRESSORS)

DIGITAL HYDRAULIC BENCH HIF

A mobile, self-contained bench with recirculating water supply. It provides water at variable flow rates direct to experiments and includes digital flow display for hydraulic and fluid mechanics experiments.



EXPERIMENT MODULES:

- Flow Visualisation (FC15) 18
- Bernoulli's Theorem (H5) 18
- Discharge Over a Notch (H6) 18
- Flow Measurement Methods (H10) 18
- Friction Loss in a Pipe (H7) 19
- Pipework Energy Losses (H34) 19
- Flow Meter Calibration (H40) 19
- Losses in Piping Systems (H16) 19
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EXPERIMENT MODULES POSTER

Upgrade your older generation gravimetric or volumetric hydraulic bench with a:

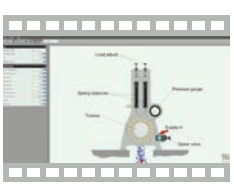
DIGITAL ELECTRONIC MEASURING KIT H1X

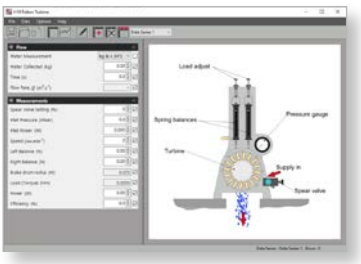
For measuring low flow rates of water being used in experiments:

LOW FLOW RANGE DISPLAY H1L

HDMS SOFTWARE HDMS

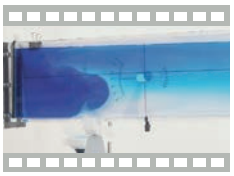
A user-friendly, simple software tool for manual data entry and recording of data for many of TecQuipment's hydraulics experiments.





FLOW VISUALISATION FC15

A compact, entry-level piece of equipment for visualising flow patterns around weirs and other objects in an open channel. Can also be used with the included lock gates to perform wave flow experiments.



DISCHARGE OVER A NOTCH

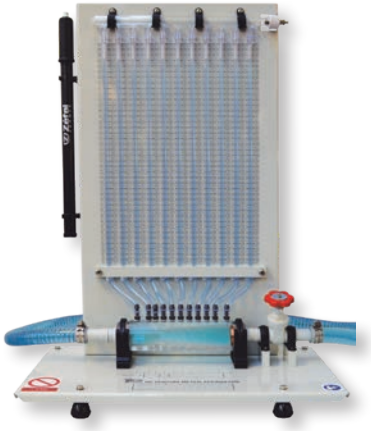
H6 HDMS

A tank and set of notch weirs for the study of flow regulation and measurement devices.

BERNOULLI'S THEOREM

H5 HDMS

A benchtop Venturi tube that allows students to study Bernoulli's theorem by measuring the complete static head distribution along the horizontal tube.

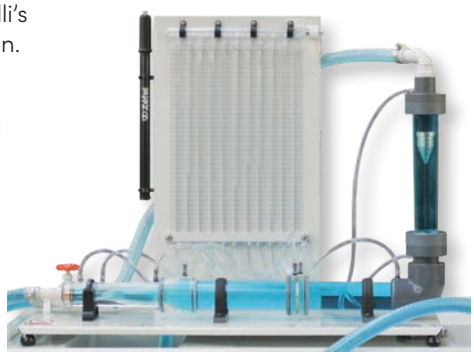


PRESSURE MEASUREMENT BENCH H30

A self-contained, benchtop apparatus that enables a range of practical investigations into manometer and Bourdon gauge pressure measurement techniques, including inclined and U-tube manometers, and Bourdon-type vacuum and pressure gauges.

FLOW MEASUREMENT METHODS H10 HDMS

A Venturi meter, an orifice plate meter and a rotameter that demonstrate typical methods of measuring the flow of an incompressible fluid and show applications of Bernoulli's equation.



CALIBRATION OF A BOURDON PRESSURE GAUGE H3A

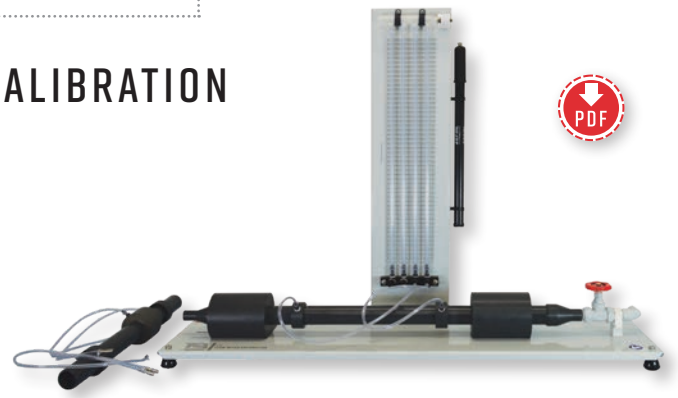
A Bourdon pressure gauge with visible working mechanism to demonstrate how this type of pressure gauge works and how to calibrate it.

PDF

FLOW METER CALIBRATION

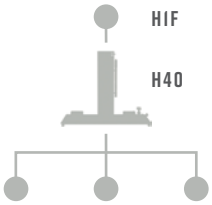
H40 HDMS

A compact manometer and nozzle flow meter that compares and demonstrates the accuracy, losses and use of fundamental flow meters.



PDF

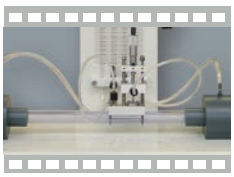
ESSENTIAL BASE UNITS



EXPERIMENT MODULES
(H40A-H40C)

EXPERIMENT MODULES:

- PDF Pitot Tube (H40a)
- PDF Venturi Flow Meter (H40b)
- PDF Orifice Flow Meter (H40c)



FRICTION LOSS IN A PIPE

PDF

H7 HDMS

A small-bore straight test pipe on a base plate for measuring friction loss in a horizontal pipe, to study laminar and turbulent flow. Also to find the critical Reynolds number and demonstrate the flow transition point.

PIPEWORK ENERGY LOSSES H34 HDMS

Compact, benchtop apparatus compares pressure losses and k value of popular fittings in small-bore pipework.

PDF

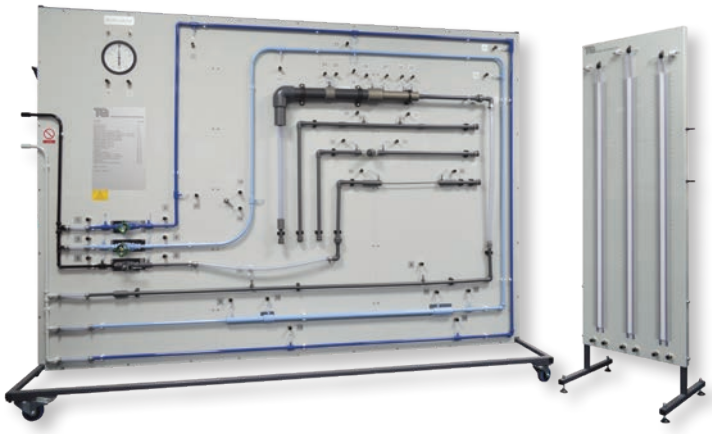
LOSSES IN PIPING SYSTEMS H16

Free-standing, mobile apparatus demonstrates pressure losses in several small-bore pipe circuit components, typical of those found in central heating systems.

PDF

FLUID FRICTION APPARATUS H408 HDMS

A mobile vertical panel featuring various pipe configurations to demonstrate flow and losses in different pipes, fittings and valves. Includes Pitot tube, Venturi and orifice meters for flow measurement.



OSBORNE REYNOLDS APPARATUS

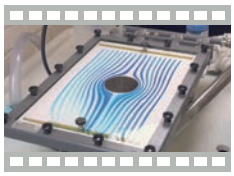
H215

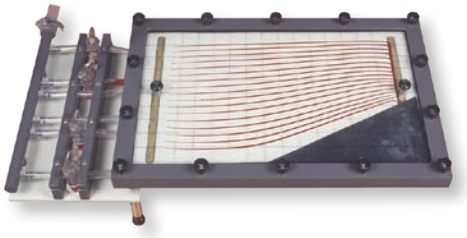
Free-standing apparatus that gives a visual demonstration of laminar and turbulent flow. It also allows students to investigate the effect of varying viscosity and investigate Reynolds numbers.

OPTIONAL HEATER MODULE (H215A)

HELE-SHAW APPARATUS H9

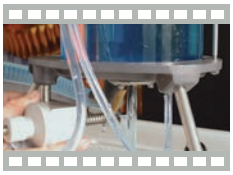
A benchtop apparatus to demonstrate two-dimensional laminar flow around differently shaped models, allowing the study of various source and sink arrangements.





FLOW THROUGH AN ORIFICE H4 HDMS

A cylindrical tank with an adjustable diffuser that demonstrates flow through different orifices for different flow rates.



IMPACT OF A JET H8 HDMS

A cylindrical tank for investigating the force generated by a jet striking plates (representing turbine vanes) to aid in the understanding of how turbines work.

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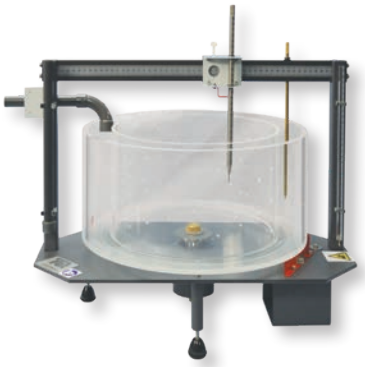
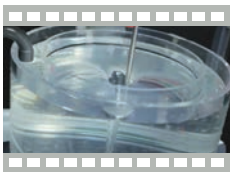
JET TRAJECTORY AND ORIFICE FLOW

H33 HDMS

A constant head device, backboard, set of nozzles and Pitot tube. This apparatus demonstrates vertical flow and horizontal jet trajectories through different orifices (nozzles) and allows students to study the trajectory profiles of water jets from the nozzles when mounted horizontally.





VORTEX APPARATUS H13 HDMS

A transparent, double-walled vessel that demonstrates the phenomena of free and forced vortices with measuring devices for calculating the water surface profile.

CAVITATION IN A VENTURI H400

A floor-standing, self-contained apparatus to demonstrate and observe the basic principles of cavitation and its implications on the performance of hydraulic machines and systems.

PIPE SURGE AND WATER HAMMER H405 VDAS®

A self-contained unit for teaching the transient effects of pipe surge and water hammer caused by sudden flow rate changes in pipes.

2.5-METRE FLUME FC50-2.5 HDMS

A 53 mm wide, 2.5 metre long flume complete with models and instruments for demonstrating flow around weirs and other objects in an open channel.

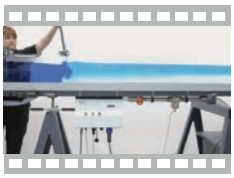
MODELS POSTER

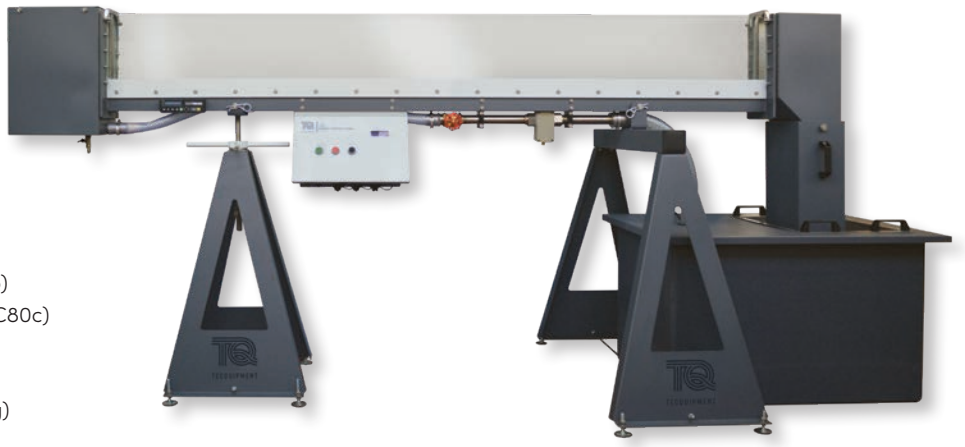
AVAILABLE ANCILLARIES:

- Flow Visualisation (FC50di)
- Roughened Bed: 2 grades (FC50k)

FLOW AND SEDIMENT TRANSPORT CHANNELS FC80 (2.5, 5 AND 7.5)

An 80 mm wide, 2.5, 5 and 7.5-metre long flow and sediment transport channel with a starter kit of models and instruments. It provides students with the ability to study the varying effects of sediment transport, bedform dynamics and fluid flow around weirs and other objects in an open channel.

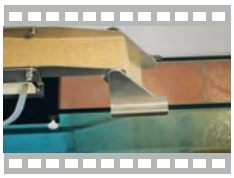




AVAILABLE MODELS:

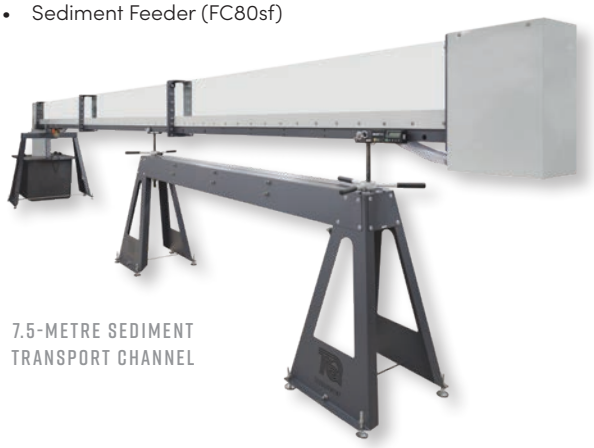
- Cylindrical Gate (FC80a)
- Radial Sector Gate (FC80b)
- Sluice Gate and Dye Kit (FC80c)
- Crump Weir (FC80d)
- Dam Spillway (FC80e)
- Streamlined Hump (FC80g)
- Parshall Flume (FC80h)
- Bridge Piers (FC80j)
- Roughened Beds (FC80k)
- Siphon Spillway (FC80l)
- Wave Generator and Beach (FC80n)
- Culvert Model (FC80p)
- Flow Splitter (FC80u)
- Flow Visualisation (FC80di)
- Sediment Feeder (FC80sf)

FLOW VISUALISATION



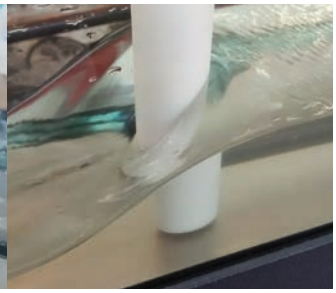
SEDIMENT FEEDER

MODELS POSTER



7.5-METRE SEDIMENT TRANSPORT CHANNEL

FLOW UNDER A SLUICE GATE



SUBCRITICAL AND CRITICAL FLOW PAST A PIER

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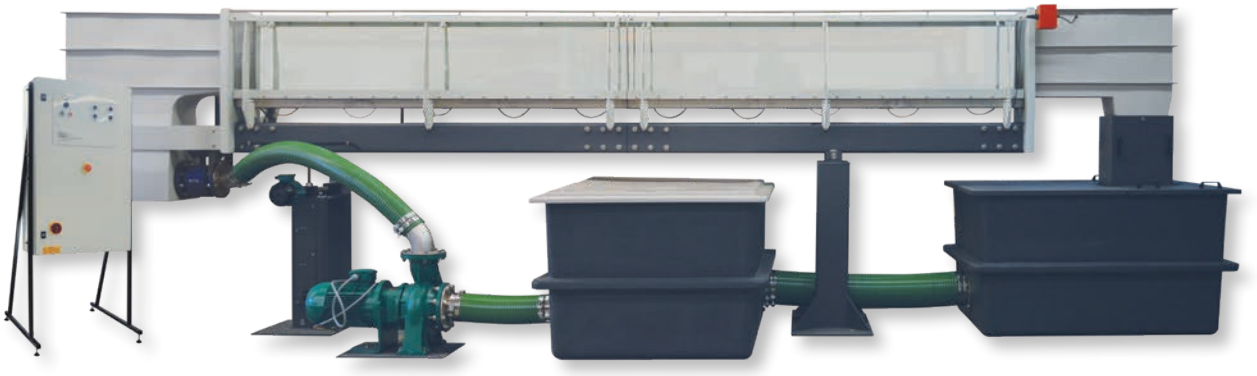
FLUMES FC300 (5, 7.5, 10, 12.5 AND 15 METRES) VDAS®

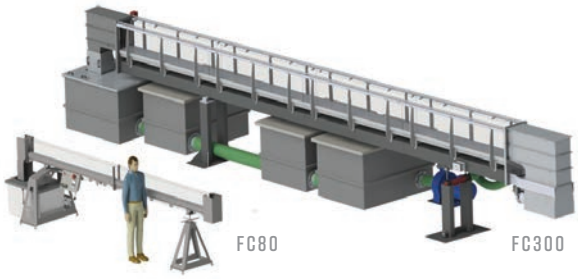
A 300 mm wide, 5 to 15-metre long flume for student study and advanced research into a wide range of fluid flow topics. A huge range of ancillaries are available to extend learning potential and offers the opportunity for innovative experimentation.



AVAILABLE MODELS:

- Radial Gate (FC300b)
- Sluice Gate with Tappings (FC300c)
- Dam Spillway (FC300e)
- Ogee Weir with Tappings (FC300e2)
- Energy Dissipation (FC300e3)
- Siphon Spillway (FC300l)
- Self-Regulating Siphon (FC300l2)
- Venturi Flume (FC300f)
- Parshall Flume (FC300h)
- Culvert Model (FC300p)
- Trapezoidal Flume (FC300z)
- Bridge Piers (FC300j)
- Vortex-Induced Vibrations (FC300m)
- Roughened Beds (FC300k)
- Lift and Drag (FC300ld)
- Crump Weir (FC300d)
- Notched Weirs (FC300q)
- Broad-Crested Weirs (FC300r)
- Sediment Loop (FC300sl)
- Wave Generator and Beach (FC300n)

MODELS POSTER



FC80 FC300

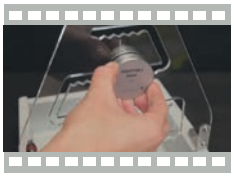
WATER HAMMER APPARATUS

TE86

A 60-metre copper coil that demonstrates water hammer and cavitation and the propagation of shock waves at sonic velocity in water.

METACENTRIC HEIGHT AND STABILITY H2 MKII

A benchtop apparatus to determine the stability of a pontoon with its centre of gravity, metacentric height and metacentre at various heights.



HYDROSTATICS AND PROPERTIES OF FLUIDS H314

Self-contained mobile unit for many experiments in fluid mechanics. Among other experiments it covers: properties of fluids, hydrostatic principles and buoyancy/floatation and Archimedes principle.

VISCOSITY AND PARTICLE DRAG

H410

Floor-standing, simple falling sphere viscometer that demonstrates the drag coefficient of different sized particles (spheres) and the viscosity of liquids.

LIQUID SEDIMENTATION APPARATUS H311

A self-contained, benchtop apparatus of transparent sediment columns for studies into the settling characteristics of suspended solids and the display of particle wall effects.

CENTRE OF PRESSURE H11

A pivoted, clear plastic assembly which students use to find the centre of pressure of a totally or partially submerged plane surface. Compact, self-contained and excellent for classroom demonstrations.

PERMEABILITY, FLOW NETS AND DARCY'S LAW H312

A self-contained, floor-standing unit consisting of a tank with tappings connected to a bank of piezometer tubes. It demonstrates flow through permeable media with common structures, such as dams and walls.

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HYDROLOGY AND RAINFALL APPARATUS H313

A self-contained, floor-standing unit consisting of a water reservoir and a tank for sand with overhead spray nozzles that simulate rainfall, both stationary and moving. It is for studying hydrology principles, including rainfall, through flow and the movement of water over land and rivers.

PDF

ADVANCED HYDROLOGY AND RAINFALL APPARATUS

PDF

H313V VDAS® ONBOARD

This is the latest version of the Hydrology and Rainfall Apparatus, the H313, with new functionality for more detailed and advanced study including VDAS® Onboard.

FRANCIS TURBINE H18 HDMS

A compact experiment for use with the Hydraulic Bench (H1F) to demonstrate how a Francis turbine works and to test its performance.

PDF

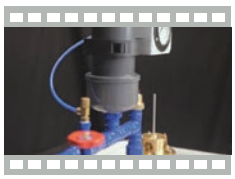
PELTON TURBINE H19 HDMS

A compact experiment for use with the Hydraulic Bench (H1F) to demonstrate how a Pelton turbine works and to test its performance.

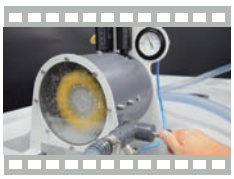
PDF

HYDRAULIC RAM PUMP H31

PDF



A compact experiment for use with the Hydraulic Bench (H1F) to demonstrate the use of water hammer to create a pumping action.

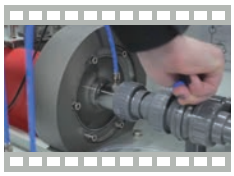


CENTRIFUGAL PUMP TEST SET

H47 VDAS®

A self-contained, floor-standing mobile unit consisting of a water reservoir, pump, motor and Venturi meter for a comprehensive range of investigations into the performance and characteristics of a centrifugal pump. Demonstrates cavitation and the use of a Venturi tube.

PDF



TWO-STAGE (SERIES AND PARALLEL) PUMPS H83 VDAS®

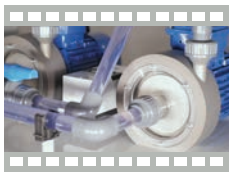
A self-contained, floor-standing mobile unit consisting of a water reservoir, two pumps and motors and a Venturi meter for a comprehensive range of investigations into the performance and characteristics of two centrifugal pumps in both series and parallel.

PDF

SERIES AND PARALLEL PUMPS H52 / H53V VDAS® ONBOARD

Two benchtop test sets that allow students to investigate the operation and performance of a single centrifugal pump and two centrifugal pumps configured in series or parallel. The H53V features a variable speed pump, speed, torque, power measurement and has VDAS® Onboard for automatic data acquisition.

PDF



SERIES AND PARALLEL PUMPS (H52)

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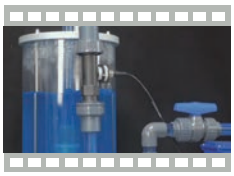

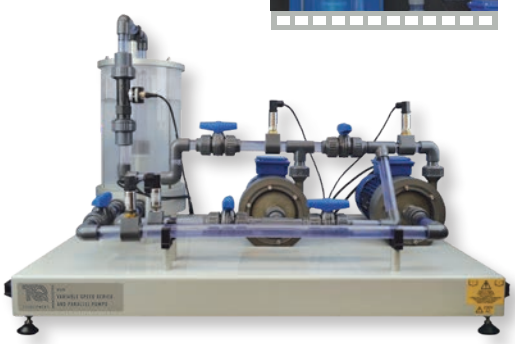

VARIABLE SPEED SERIES AND PARALLEL PUMPS (H53V)

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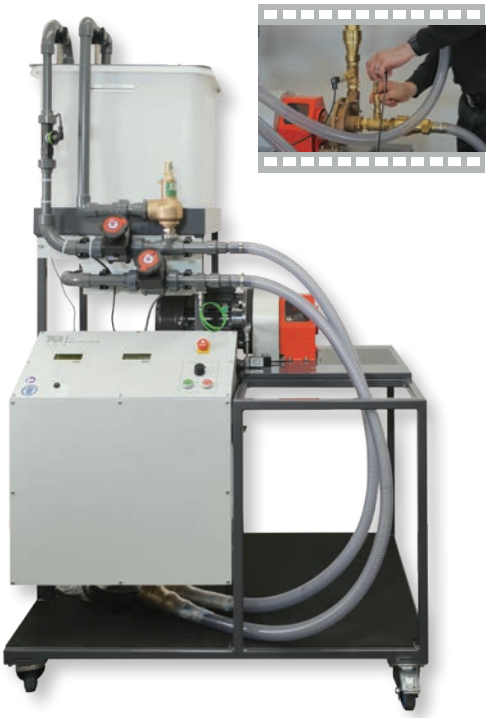
MULTI-PUMP TEST SET H85V VDAS ONBOARD

A versatile, self-contained mobile unit designed to investigate and demonstrate the performance characteristics of a range of different pump types.

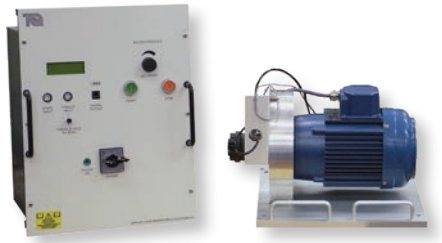


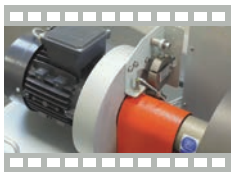
EXPERIMENT MODULES:

- Gear Pump (H85a)
- Piston Pump (H85b)
- Centrifugal pump (H85c)
- Rotodynamic Axial Pump (H85d)
- Vane Pump (H85e)
- Lobe Pump (H85f)
- Channel Impeller Pump (H85g)

UNIVERSAL DYNAMOMETER MFP100

A dynamometer with sensors for measuring power, speed and torque. For use with the Modular Fluid Power range.

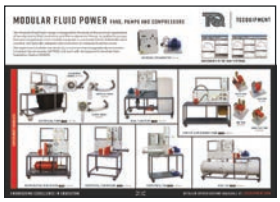




EXPERIMENT MODULES:

ESSENTIAL BASE UNIT
(MFP100)

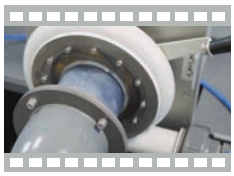
EXPERIMENT MODULES
(MFP101-MFP107)



EXPERIMENT MODULES POSTER

CENTRIFUGAL PUMP MODULE MFP101 VDAS

A self-contained, floor-standing mobile unit with full instrumentation for studying and performing tests on a centrifugal pump and optional turbines, to understand how they work and calculate performance.



EXPERIMENT MODULES:

- Pelton Wheel (Turbine) (MFP101b)
- Propeller Turbine (MFP101c)
- Francis Turbine (MFP101d)

AXIAL FLOW PUMP MODULE

MFP102 VDAS®

A self-contained, floor-standing mobile unit consisting of a water reservoir, pump, calibrated nozzle and valves. It allows students to study and perform tests on an axial flow pump, to understand how it works and calculate its performance.

PDF

POSITIVE DISPLACEMENT PUMP MODULE MFP103 VDAS®

A self-contained, floor-standing mobile unit with full instrumentation consisting of an oil reservoir, a positive displacement flow meter, valves and instruments to measure positive displacement pump performance.

EXPERIMENT MODULES:

- PDF Piston Pump (MFP103a)
- PDF Gear Pump (MFP103b)
- PDF Vane Pump (MFP103c)
- PDF Swash Plate Pump (MFP103d)

PDF

RECIPROCATING COMPRESSOR MODULE

MFP104 VDAS®

A self-contained, floor-standing mobile unit that includes a small compressor with an air receiver and instrumentation. It allows students to study and perform tests on a reciprocating compressor, to understand how it works and calculate its performance.

PDF

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CENTRIFUGAL COMPRESSOR MODULE MFP105 VDAS®

A self-contained, floor-standing mobile unit that includes a small compressor and instrumentation. It allows students to study and perform tests on a centrifugal compressor, to understand how it works and calculate its performance.

CENTRIFUGAL FAN MODULE

MFP106 VDAS®

A self-contained, floor-standing mobile unit that includes a fan and instrumentation to allow students to study and perform tests on a centrifugal fan, to understand how it works and calculate its performance.

AXIAL FAN MODULE MFP107 VDAS®

A self-contained, floor-standing mobile unit that includes an axial fan, duct and instrumentation. It allows students to study and perform tests on an axial fan, to understand how it works and calculate its performance.

PRODUCT DEVELOPMENT

Products are continually being improved. For the latest up-to-date specification refer to the digital datasheets at TECQUIPMENT.COM

MATERIALS TESTING AND PROPERTIES

BASIC ELASTIC PROPERTIES
STRESS AND STRAIN ANALYSIS
TORSION TESTING
FATIGUE TESTING
CREEP TESTING
TENSILE AND UNIVERSAL TESTING MACHINES
IMPACT TESTING
INDUSTRIAL HARDNESS TESTERS
TEST SPECIMENS
FREE-STANDING STRUCTURES EXPERIMENTS

HOOKE'S LAW AND SPRING RATE SM110 DEFLEX

Benchtop apparatus tests extension springs to find their properties. Proves Hooke's law and the basic rules of spring design.

PDF

THIN CYLINDER SM1007 VDAS®

Benchtop machine to allow students to perform stress and strain tests on a thin-walled cylinder. Introducing Mohr's circle and Poisson's ratio.

PDF

STIFFNESS, BENDING AND TORSION TE16 DEFLEX

Compact, benchtop apparatus enabling a variety of investigations into material stiffness including Young's modulus.

PDF

DIAPHRAGM SM1008 VDAS®

Benchtop machine to allow students to perform stress, strain and deflection tests on a diaphragm.

PDF

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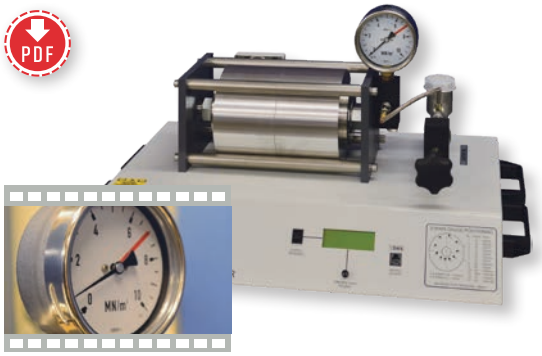
THICK CYLINDER SM1011 VDAS®

Benchtop machine to allow students to perform stress and strain tests on a thick-walled cylinder.



DIGITAL STRAIN DISPLAY

SM1010 VDAS®

A 16-channel instrument that connects to industry-standard strain gauges to give direct readings of strain.

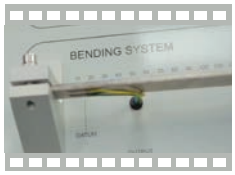
STRAIN GAUGE KIT E19

Selection of resistance strain gauges and necessary accessories and consumable materials, for use with TecQuipment's SM1010 Digital Strain Display.

STRAIN GAUGE TRAINER SM1009

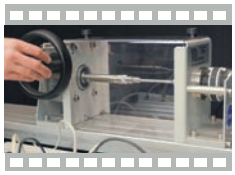
VDAS®

Benchtop bending system to test tension, torsion and bending to illustrate how resistance strain gauges work and methods of measuring strains in different structures. Can be used to demonstrate Young's modulus and Poisson's ratio.



TORSION TESTING MACHINE, 30 NM SM1001 VDAS®

Benchtop machine to allow students to do torsion tests on different materials. Demonstrates Bauschinger effect.



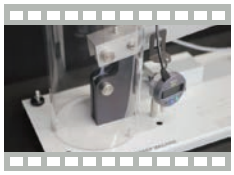
ROTATING FATIGUE MACHINE SM1090V VDAS® ONBOARD

A benchtop machine for demonstrating the failure of materials when subjected to an alternating stress, showing both low and high cycle fatigue.

CREEP MACHINE

SM1006 VDAS® DEFLEX

Benchtop machine which demonstrates the phenomenon of creep under different conditions and in different materials.



PDF

BENCHTOP TENSILE TESTING MACHINE SM1002 VDAS® DEFLEX

A laboratory-scale, hand-driven benchtop tensile testing machine, 20 kN capacity.

PDF

UNIVERSAL TESTING MACHINE SM1000 VDAS® DEFLEX

A versatile, bench-mounted machine for compressive and tensile tests on different materials and structures.

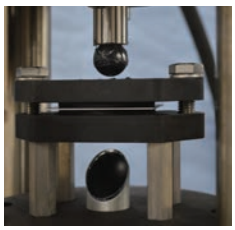
PDF

EXPERIMENT MODULES:

- PDF Brinell Indenter (SM1000e)
- PDF Coil Spring (SM1000f)
- PDF Beam and Leaf Spring (SM1000g)
- PDF Cupping Experiment (SM1000h)
- PDF Double Shear Experiment (SM1000j)
- PDF Disc Spring Experiment (SM1000k)

EXPERIMENT MODULES POSTER

UNIVERSAL TESTING MACHINE

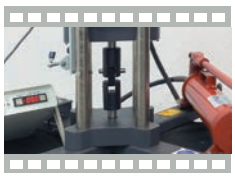


CUPPING EXPERIMENT

MATERIALS LABORATORY WITH DATA CAPTURE MF40 MKII DEFLEX

A versatile, benchtop machine for compressive and tensile tests on different materials and structures.

PDF



CUPPING, SPRING AND SHEAR EXPERIMENT

VIDEO CASE STUDY

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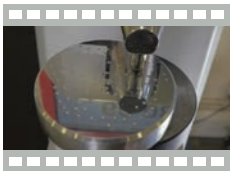
ENERGY ABSORBED AT FRACTURE TE15

Compact, benchtop apparatus for testing notched specimens. Forms an introduction to impact testing such as Izod and Charpy.

ROCKWELL HARDNESS TESTER SM1015 MKII

A benchtop industrial-standard tester for accurate measurements of Rockwell hardness.



UNIVERSAL HARDNESS TESTER SM1017

A benchtop industrial-standard tester for accurate measurements of Vickers, Brinell and Rockwell hardness.

NEW

DEFLEX®

A digital image correlation (DIC) system to teach students how to measure and visualise surface deformations, strains and displacements in materials and shapes.

Go to page 60 for more info.

UNSYMMETRICAL CANTILEVER APPARATUS SM1003 VDAS®

A benchtop test frame for examining and displaying bending of an unsymmetrical cantilever. Demonstrates the use of Mohr's circle.

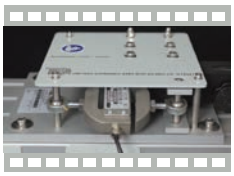
BEAM APPARATUS

SM1004 VDAS® DEFLEX®

A benchtop frame with load cells and cantilevers for the study of deflection and forces on different types of beams for a wide range of supports and loads. Also demonstrates Young's modulus. Set of additional beams and strain gauged beam available.

EULER BUCKLING APPARATUS SM1005 VDAS®

Benchtop apparatus tests different types of struts and demonstrates how they deflect under load, and demonstrates the use of Southwell's method. Set of additional struts available.

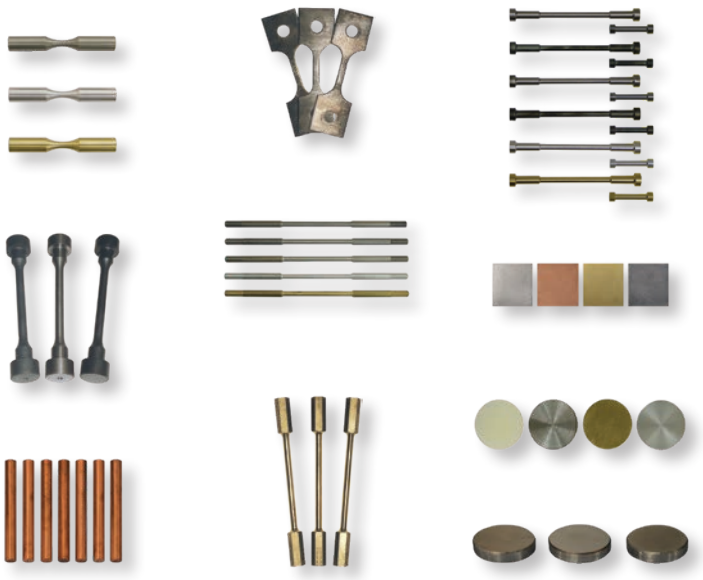


COMPOSITE BEAM SETS FOR THE SM1004 AND SM1005

- Basic Composite Beam Set (SM1004d1 / SM1005b1)
- Cored Composite Beam Set (SM1004d2 / SM1005b2)
- Variable Stiffness Composite Beam Set (SM1004d3 / SM1005b3)

TEST SPECIMENS

- Creep Test Specimens (CP)
- Rotating Fatigue Specimens (RF)
- Torsion Test Specimens (TR)
- Tensile Test Specimens (TH)
- Double Shear Test Specimens (DS)
- Cupping Test Specimens (ER)
- Tensile Test Specimens (TL and TS)
- Tensile Test Specimens (ML)
- Hardness Test Specimens (HTP)
- Hardness Reference Blocks (HTB)



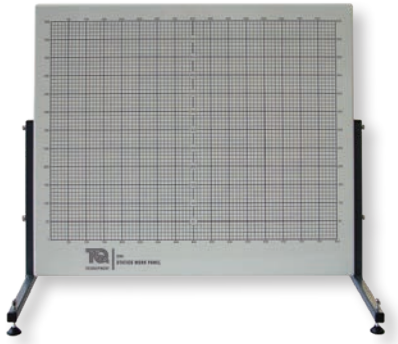
STATICS FUNDAMENTALS

STATICS WORK PANEL

STF1

Work panel for use with TecQuipment's Statics Fundamentals (STF) range.

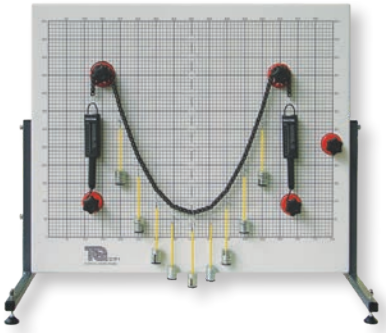
PDF



SUSPENSION CABLE DEMONSTRATION STF2

A kit for use with the work panel that demonstrates the tensions and shapes in a suspension cable, comparing them with theory.

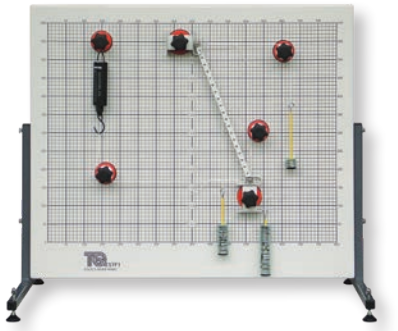
PDF



EQUILIBRIUM OF A RIGID BODY STF3

A kit for use with the work panel that demonstrates the forces around a ladder-type structure.

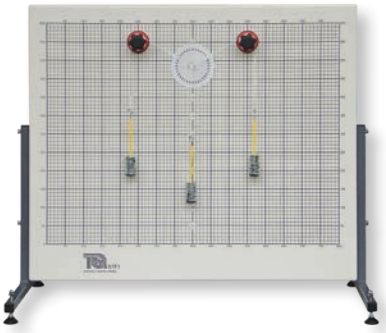
PDF



EQUILIBRIUM OF FORCES STF4

A kit for use with the work panel for experiments with three or more coplanar forces at equilibrium and an introduction to Bow's notation.

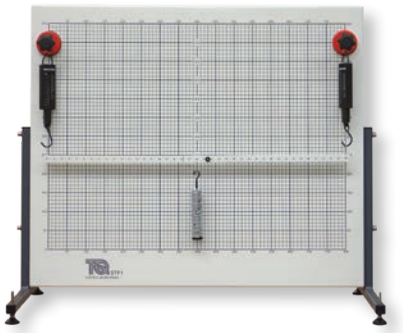
PDF



EQUILIBRIUM OF A BEAM STF5

A kit for use with the work panel for experiments with forces, moments and reactions around a beam at equilibrium.

PDF



NEXT GENERATION STRUCTURES

STRUCTURES PLATFORM

ARCHES, BRIDGES AND TRUSSES

FAILURE

DEFLECTIONS AND STRESS

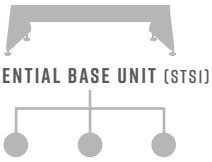
MOMENTS

TORSION

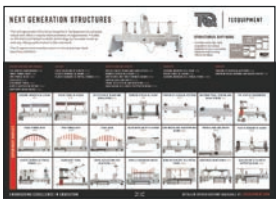
STRUCTURES PLATFORM STS1

A benchtop platform that holds the experiments of the Structures range.

INTRODUCTION TO NEXT GENERATION STRUCTURES



SIMULATION CAPABILITIES OF THE STS RANGE USING VDAS® SOFTWARE



EXPERIMENT MODULES POSTER

SCREENSHOTS OF THE VDAS® SOFTWARE

EXPERIMENT MODULES:

ARCHES, BRIDGES AND TRUSSES

FAILURE

DEFLECTIONS AND STRESS

MOMENTS

TORSION

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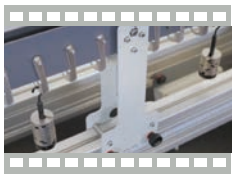
BENDING MOMENTS IN A BEAM STS2

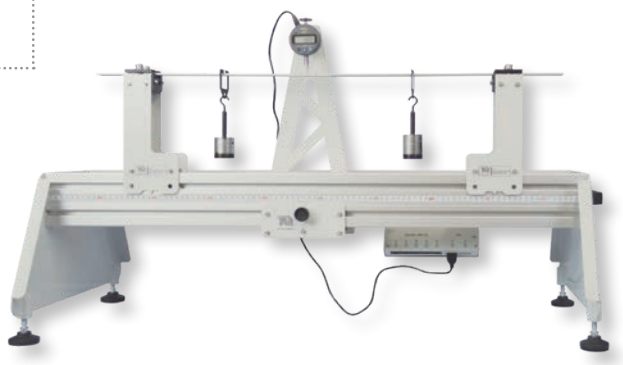
Experiment that illustrates and proves the basic theory of bending moments in a beam.



SHEAR FORCE IN A BEAM

STS3

Experiment that illustrates and proves the basic theory of shear force in a beam.

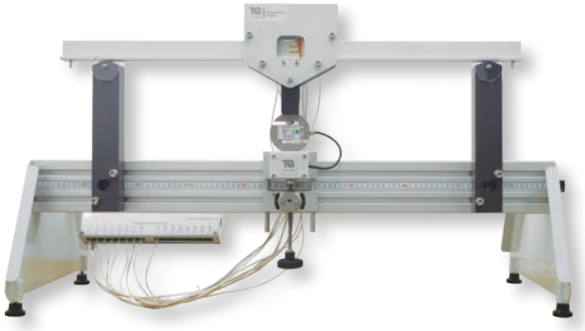


DEFLECTION OF BEAMS AND CANTILEVERS STS4

Experiment for the study of beam deflection under different loads and fixing conditions, and the demonstration of Young's modulus.

BENDING STRESS IN A BEAM STS5

Experiment for the study of stress distribution across the section of a beam.

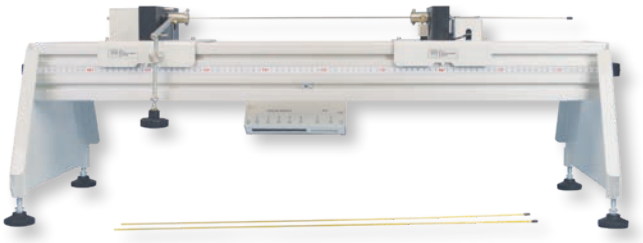


BENDING STRESS IN A BEAM EXPERIMENT

EXAMINING THE LOAD AND STRAIN GAUGE RELATIONSHIP

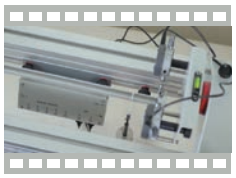
TORSION OF CIRCULAR SECTIONS STS6

Experiment for the study of torque and deflection in different materials with circular section.



UNSYMMETRICAL BENDING AND SHEAR CENTRE STS7

Experiment for the study of the vertical and horizontal deflection of different unsymmetrical sections.

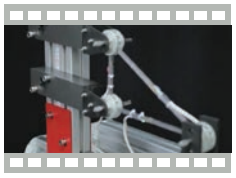


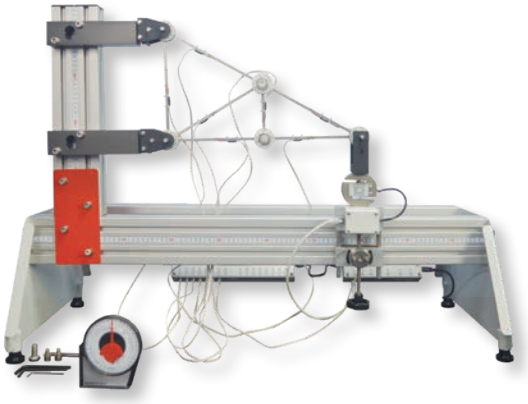
UNSYMMETRICAL BENDING AND SHEAR CENTRE

UNSYMMETRICAL BENDING AND SHEAR CENTRE EXPERIMENT

PIN-JOINTED FRAMEWORKS STS8

Experiment for the study of strains, stresses, forces and deflections in various pin jointed frameworks, and the study of Bow's notation.





THREE-PINNED ARCH STS9

Experiment for the study of the characteristics of a three-pinned arch under various load conditions.

TWO-PINNED ARCH STS10

Experiment for the study of the characteristics of a two-pinned arch under various load conditions.

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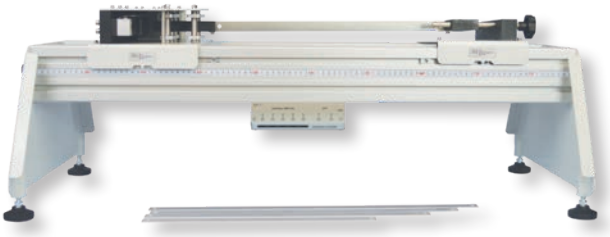
FIXED ARCH STS11

Experiment for the study of the characteristics of a fixed arch under various load conditions.

EULER BUCKLING OF STRUTS STS12

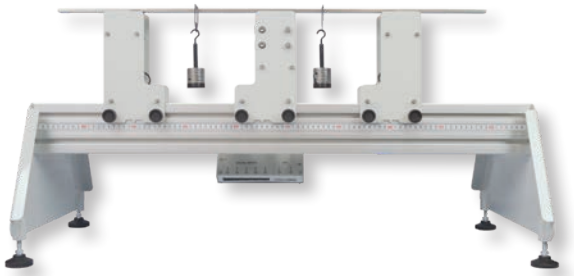
Experiment for the study of buckling of struts and the relationships between length, end fixing conditions and buckling load.

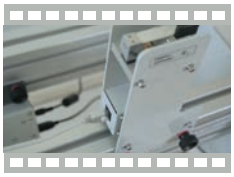


CONTINUOUS AND INDETERMINATE BEAMS

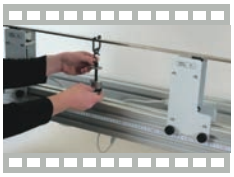
STS13

Experiment that can be used to perform a wide variety of beam experiments, from simple cases to complex problems.





CONTINUOUS AND INDETERMINATE BEAMS EXPERIMENT

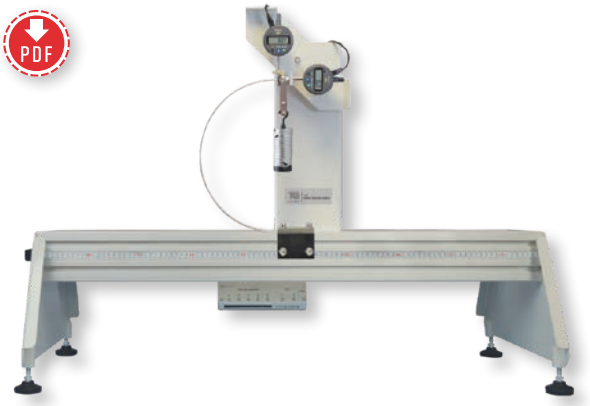


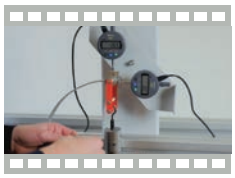
EXAMINING THE CENTRAL LOAD POINT

CURVED BARS AND DAVITS

STS14

Experiment for investigations into two common curved structures and two common davit structures.





DEFLECTION OF CURVED BARS AND DAVITS

CURVED BARS AND DAVITS EXPERIMENT

PLASTIC BENDING OF BEAMS

STS15

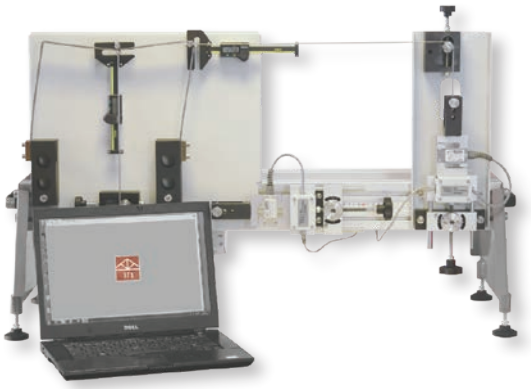
Experiment for the study of plastic theory and limit state design of beams.

PLASTIC BENDING OF PORTALS

STS16 VDAS ONBOARD DEFLEX

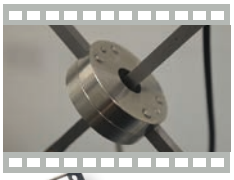
Experiment for the study of plastic theory and limit state design in portal frames.

PDF



REDUNDANT TRUSS STS17 VDAS ONBOARD

Experiment for the study of determinate and indeterminate truss structures.



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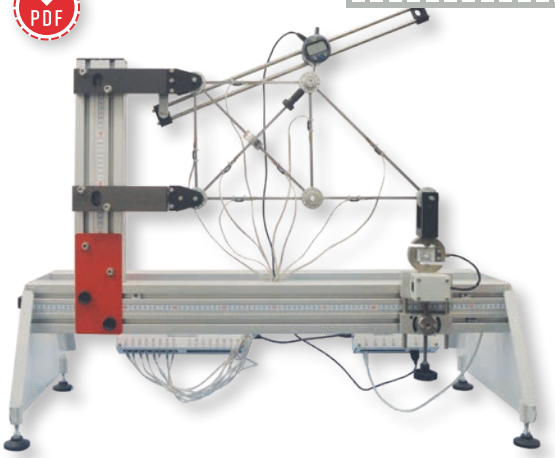


FRAME DEFLECTIONS AND REACTIONS STS18 VDAS ONBOARD DEFLEX

Experiment for the study of rectangular portals subjected to vertical loads.

PDF

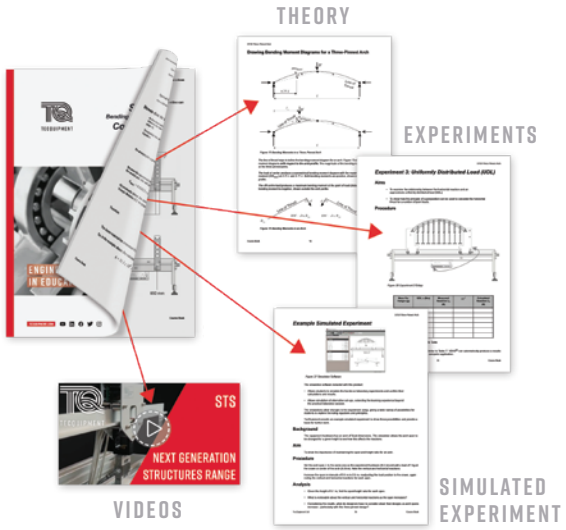
DIGITAL STUDENT COURSE BOOKS

Enhancing students' learning and understanding of basic structural principles focusing on beams, bridges and cantilevers, these course books provide real-life examples and theories and run through the experimental set-up, procedures and analysis.

These free teaching materials include:

- Relevant theory
- Experiments with step-by-step instructions
- Simulated experiment
- Useful videos
- Easy to use on all platforms

VISIT WEBSITE FOR MORE INFO



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SIMPLE SUSPENSION BRIDGE

STS19 VDAS® ONBOARD DEFLEX®

Experiment for the study of the characteristics of a simple suspension bridge.

PDF

NEW

DEFLEX®

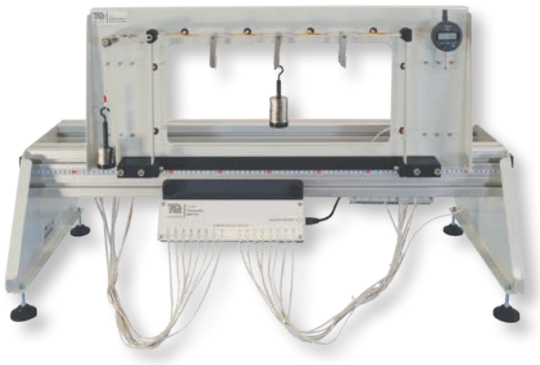
A digital image correlation (DIC) system to teach students how to measure and visualise surface deformations, strains and displacements in materials and shapes.

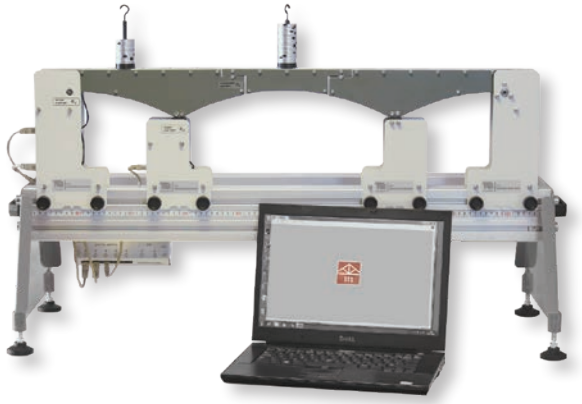
Go to page 60 for more info.

BENDING MOMENTS IN A PORTAL FRAME STS20 VDAS® ONBOARD

Experiment for the study of bending moments and sway in portal frames.

PDF





SUSPENDED BEAM BRIDGE

STS21 VDAS® ONBOARD

Experiment for the study of the characteristics of a suspended beam bridge.

PDF

EQUILIBRIUM OF A SIMPLY SUPPORTED BEAM STS22 VDAS® ONBOARD

Experiment for the study of the characteristics of a simply supported beam.

PDF

THEORY OF MACHINES

FRICTION

MOTION

VIBRATION

AIR BEARING APPARATUS TE96

VDAS®

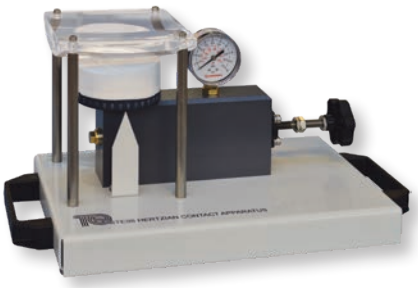
Benchtop, self-contained air bearing apparatus to demonstrate the performance of self-acting, gas-lubricated journal bearings, including the phenomenon of half-speed whirl.

PDF

HERTZIAN CONTACT APPARATUS TE98

Benchtop, self-contained unit that allows a practical examination of Hertz's theories of contact between materials.

PDF



MICHELL PAD APPARATUS TE99

A benchtop, self-contained apparatus to demonstrate the pressure distribution across the film of oil in a Michell tilting pad slider bearing. Helps to prove Reynold's equation for pressure gradient in fluid film.

PDF

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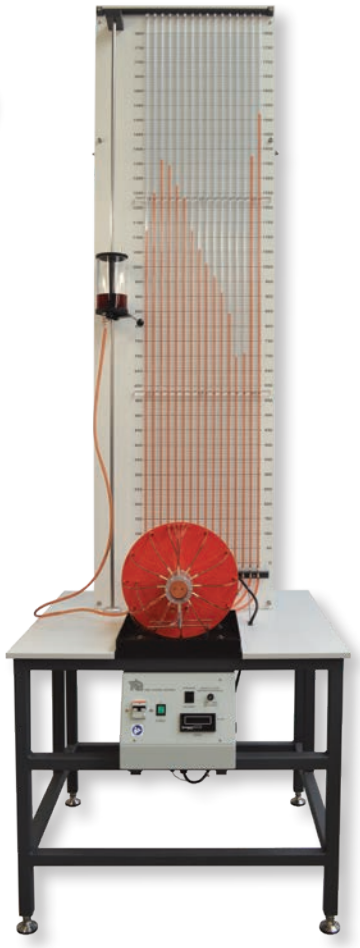
JOURNAL BEARING DEMONSTRATION TM25

Floor-standing apparatus for demonstrating the pressures around a journal bearing at different speeds.

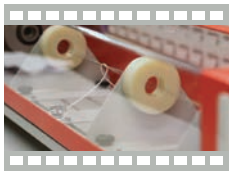


CAM ANALYSIS MACHINE TM102IV

Benchtop apparatus and control and instrumentation unit, for studying the dynamic behaviour of different cams and followers and their 'bounce' speed.

WHIRLING OF SHAFTS AND CRITICAL SPEED TM1001

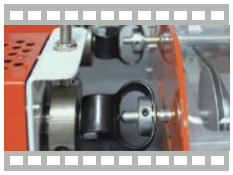
Benchtop apparatus that demonstrates 'whirling' in different horizontal shafts with a variety of fixings (end conditions), loaded and unloaded.



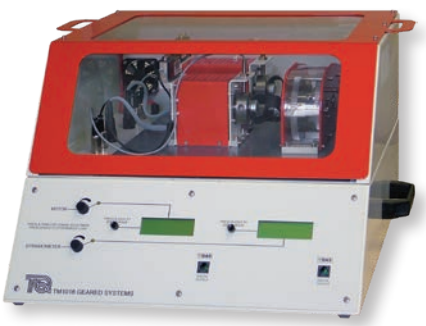
GEARED SYSTEMS TM1018

Benchtop apparatus for dynamic and static experiments on geared and other drive systems. This base unit requires at least one of the optional drive units: toothed belt drive, round belt drive, chain drive and helical gear drive.

EXPERIMENT MODULES:



- Toothed Belt Drive (TM1018b)
- Round Belt Drive (TM1018c)
- Chain Drive (TM1018d)
- Helical Gear Drive (TM1018e)

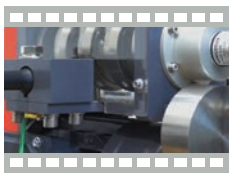


BALANCE OF RECIPROCATING MASSES TM1022V

VDAS ONBOARD

Bench-mounted model four-cylinder engine with control and instrumentation unit that demonstrates the primary and secondary forces and moments when balancing reciprocating masses.

PDF

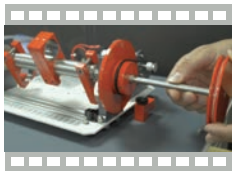


STATIC AND DYNAMIC BALANCING

TM1002

Benchtop apparatus for experiments in balancing a rotating mass system, statically and dynamically.

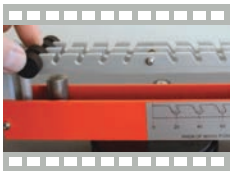
PDF



CENTRIFUGAL FORCE TM1005 VDAS

Benchtop apparatus for experiments in centrifugal force and angular velocity.

PDF



GYROSCOPE TM1004 VDAS

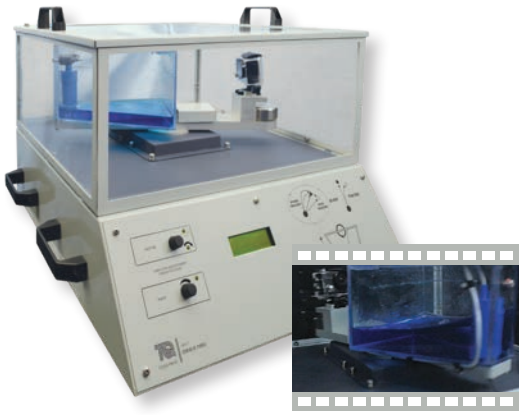
Benchtop apparatus for experiments in gyroscopic couple and velocities of rotor and precision.

PDF

CORIOLIS FORCE TM1017

Benchtop apparatus for demonstrations and experiments in Coriolis force.

PDF



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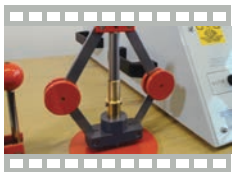
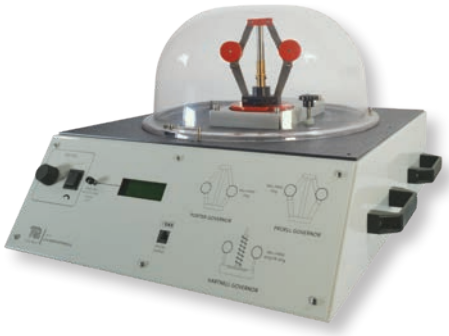
GOVERNORS TM1027

Benchtop apparatus for demonstrating how different governors work, including Hartnell, Porter and Proell governors.

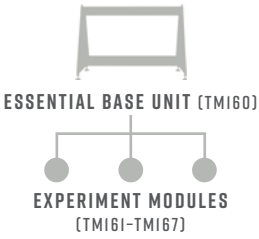




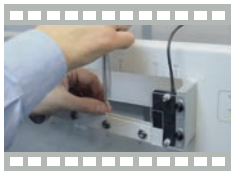
FREE VIBRATIONS TEST FRAME

TM160

A sturdy benchtop frame for use with the Free Vibrations experiment modules.

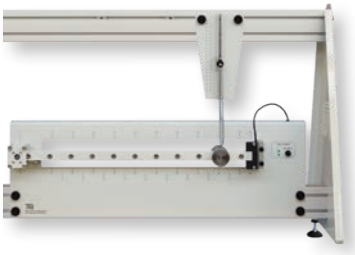


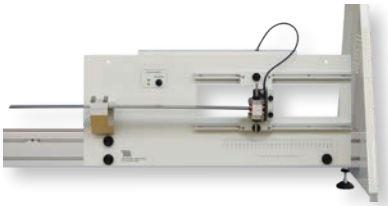
EXPERIMENT MODULES:



- Simple and Compound Pendulums (TM161)
- Filar Pendulums (TM162)
- Centre of Percussion (TM163)
- Free Vibrations of a Mass Spring System (TM164) VDAS® DEFLEX
- Free Torsional Vibrations (TM165) VDAS® DEFLEX
- Free Vibrations of a Cantilever (TM166) VDAS® DEFLEX
- Free Vibrations of a Beam and Spring (TM167) VDAS® DEFLEX

EXPERIMENT MODULES POSTER

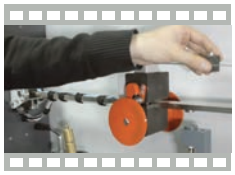




FREE AND FORCED VIBRATIONS

TM1016V VDAS® ONBOARD DEFLEX

Investigates the free and forced vibrations of a rigid beam with a spring, and a simply supported beam. Demonstrates Rayleigh's approximation and Dunkerley's method.



THERMODYNAMICS

THERMODYNAMIC PRINCIPLES
HEAT TRANSFER
TEMPERATURE
COMPRESSORS
STEAM

IDEAL GASES – BOYLE'S LAW

TD1000 VDAS®

Benchtop apparatus that demonstrates the relationship between pressure and volume of an ideal gas at a fixed temperature.

PDF

IDEAL GASES – GAY-LUSSAC'S LAW

TD1001 VDAS®

Benchtop apparatus that demonstrates the relationship between pressure and temperature of a fixed volume of ideal gas.

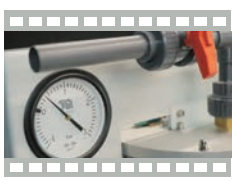
PDF

EXPANSION OF A PERFECT GAS

TD1004V VDAS ONBOARD®

Benchtop apparatus to demonstrate the behaviour and expansion processes of a perfect gas.

PDF



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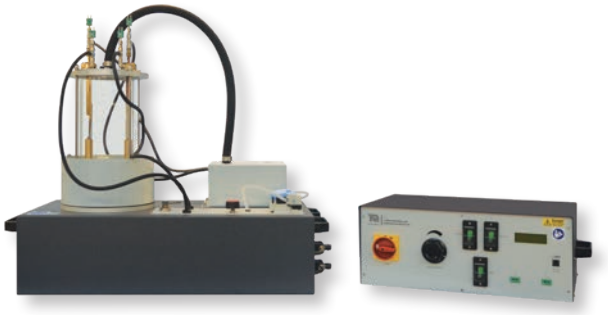
FILMWISE AND DROPWISE CONDENSATION AND BOILING

TE78 VDAS®

Benchtop apparatus with control and instrumentation unit that demonstrates heat transfer during different boiling and condensing processes.



EMISSIVITY - NATURAL CONVECTION AND RADIATION TDIOIIV

VDAS® ONBOARD

Trolley-mounted, mobile apparatus that demonstrates how different types of heat can transfer over a range of pressures; helps the understanding of the Stefan Boltzman constant.

UNSTEADY STATE HEAT TRANSFER

TDIOO9V VDAS® ONBOARD

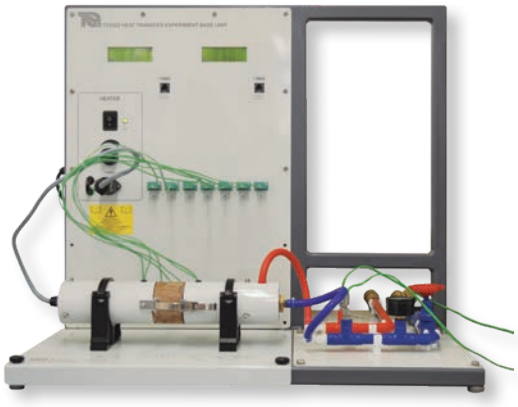
Benchtop apparatus that measures unsteady state heat transfer to bodies of different shape and thermal conductivity.

FORCED CONVECTION HEAT TRANSFER TDI

Trolley-mounted, mobile apparatus that demonstrates forced convection in pipes and heat transfer theory. Illustrates the derivation of the value of Nusselt number, determination of the Stanton number and determination of the validity of the Reynolds analogy for air.

HEAT TRANSFER EXPERIMENTS BASE UNIT TD1002 VDAS®

A benchtop base unit for demonstrating different methods of heat transfer. Requires at least one of the four optional experiments.



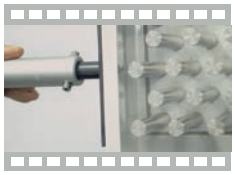
BASE UNIT FITTED WITH THE LINEAR HEAT CONDUCTION EXPERIMENT

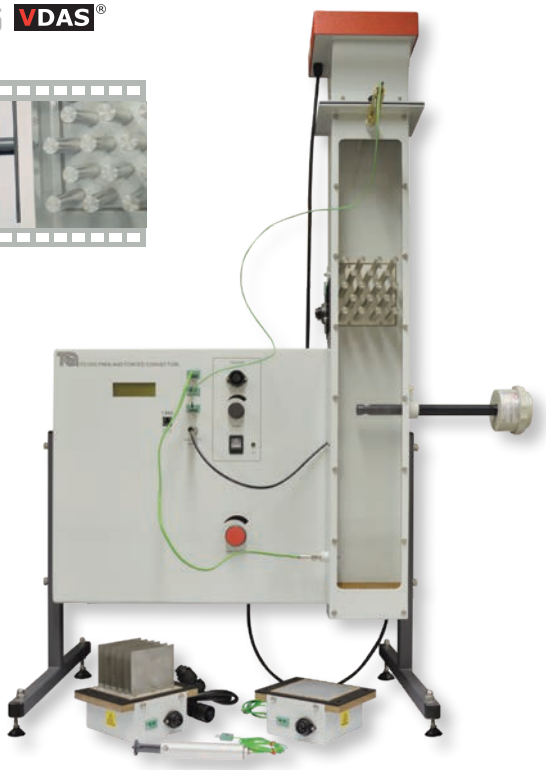
EXPERIMENT MODULES:

- Linear Heat Conduction Experiment (TD1002a)
- Radial Heat Conduction Experiment (TD1002b)
- Extended Surface Heat Transfer Experiment (TD1002c)
- Conductivity of Liquids and Gases Experiment (TD1002d)

FREE AND FORCED CONVECTION TD1005 VDAS®

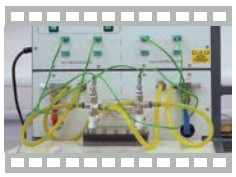
Benchtop apparatus that illustrates free and forced convection from different transfer surfaces.

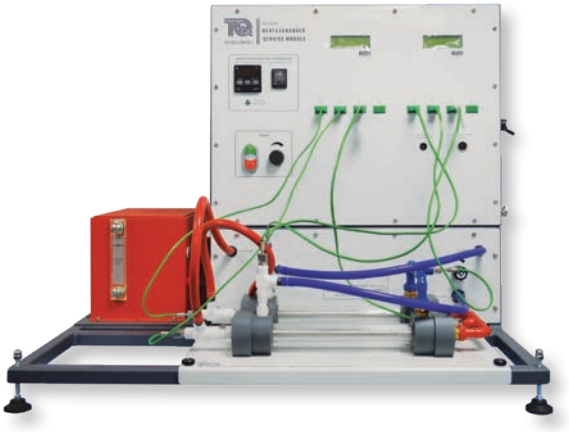




HEAT EXCHANGER SERVICE MODULE TD1360V VDAS® ONBOARD

A benchtop base unit for examining and comparing small-scale heat exchangers to help students understand how they work. Requires at least one of the five associated experiments.





SERVICE MODULE FITTED WITH THE CONCENTRIC TUBE HEAT EXCHANGER EXPERIMENT (TD1360A)

EXPERIMENT MODULES:

- Concentric Tube Heat Exchanger (TD1360a)
- Plate Heat Exchanger (TD1360b)
- Shell and Tube Heat Exchanger (TD1360c)
- Jacketed Vessel with Coil and Stirrer (TD1360d)
- Cross-Flow Water-To-Air Heat Exchanger (TD1360e)

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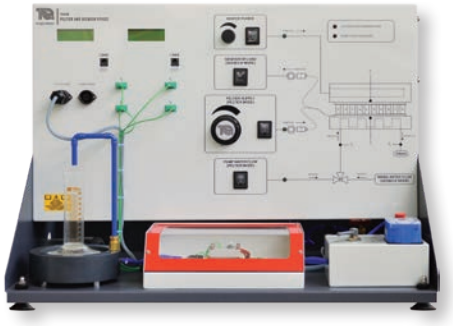
PELTIER AND SEEBECK EFFECT

TD1008 VDAS®

Benchtop apparatus that examines the performance of a thermoelectric device when connected for Peltier heat pump or Seebeck exchanger.



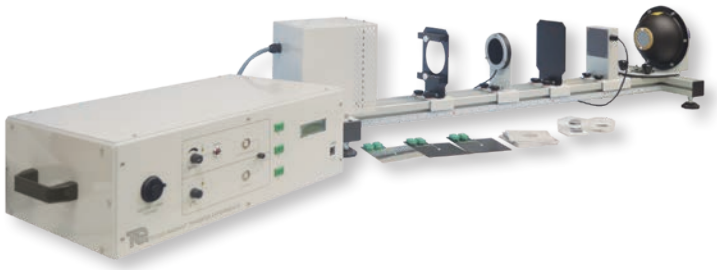
CROSS-FLOW HEAT EXCHANGER

TE93 VDAS®

Benchtop apparatus with a control and instrument unit for studies into the principles and performance of heat exchangers.

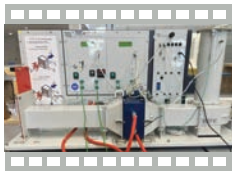
RADIANT TRANSFER EXPERIMENTS TD1003 VDAS®

Benchtop apparatus with a control box that demonstrates the laws of radiant transfer from heat and light sources.



WATER-TO-AIR HEAT EXCHANGERS TD1007 VDAS®

Benchtop apparatus that illustrates how cross-flow water-to-air heat exchangers work. Includes a 32-tube heat exchanger. Also available separately are 16-tube and finned heat exchangers.

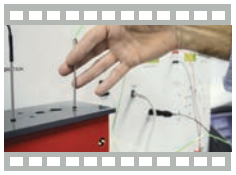


16-TUBE HEAT EXCHANGER

16-TUBE FINNED HEAT EXCHANGER

TEMPERATURE MEASUREMENT AND CALIBRATION TD400 VDAS®

Benchtop apparatus that studies the accuracy, linearity and important characteristics of popular temperature measuring devices.

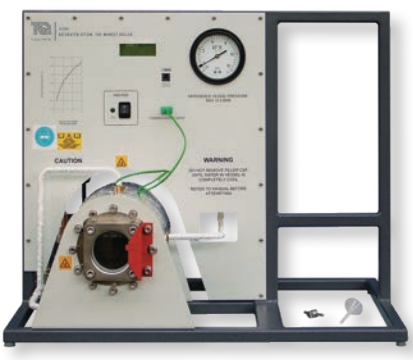


BOMB CALORIMETER TD500

For the accurate determination of the calorific value of liquid and solid hydrocarbons.

TWO-STAGE COMPRESSOR TEST SET GT103

Trolley-mounted, mobile apparatus that illustrates how single and two-stage compressors work, and their thermodynamic properties.



SATURATED STEAM – THE MARCET BOILER TD1006 VDAS®

Benchtop apparatus that illustrates the pressure and temperature relationship for saturated steam.

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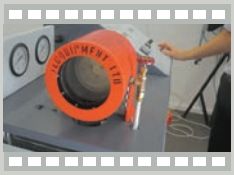
NEW

THERMAL POWER PLANT WITH STEAM TURBINE TD1060V

VDAS® ONBOARD

Mobile laboratory-scale steam turbine that demonstrates fundamental thermodynamic principles of energy conversion and mechanical power measurement.

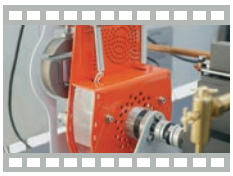


PDF

THERMAL POWER PLANT WITH STEAM ENGINE TRAINER TD1050 VDAS®

Trolley-mounted, mobile, laboratory-scale steam plant that demonstrates fundamental thermodynamic principles of energy conversion and mechanical power measurement.

PDF

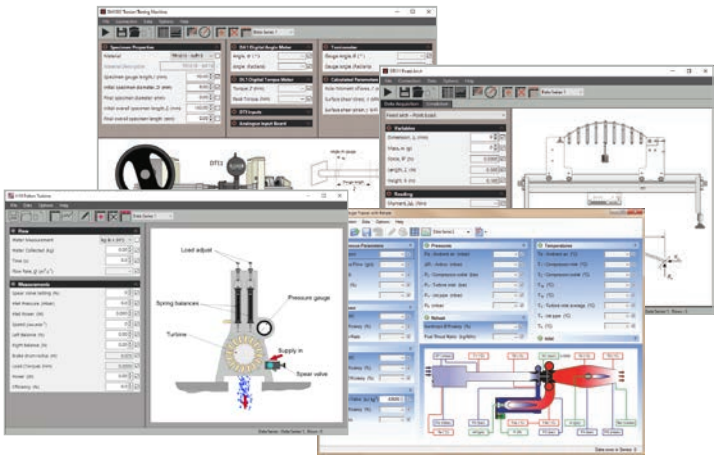


SOFTWARE DOWNLOADS

TecQuipment develops in-house software to support and further enhance the experimental capabilities of our equipment:

- VDAS®
- HDMS
- LabVIEW
- Gas Turbines
- CE2000 Control

TECQUIPMENT.COM/DOWNLOADS



ENGINES

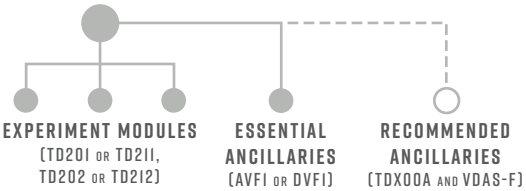
INTERNAL COMBUSTION ENGINE TEST SETS

GAS TURBINES

SMALL ENGINE TEST SET TD200 VDAS®

Trolley-mounted, mobile engine test bed with benchtop instrumentation for investigations into the fundamental features of internal combustion engines. Requires at least one of the eight available engines, available in pull or electric start (ES).

ESSENTIAL BASE UNIT (TD200)



EXPERIMENT MODULES:

- Four-Stroke Petrol Engine (TD201)*
- Four-Stroke Diesel Engine (TD202)*
- Modified Four-Stroke Petrol Engine (TD211)*
- Modified Four-Stroke Diesel Engine (TD212)*

* Available with electric start

AUTOMATIC VOLUMETRIC FUEL GAUGE DVFI VDAS®

Frame-mounted automatic fuel gauge with digital display,for use with TecQuipment's Engine Test Sets (TD200 and TD300).

MANUAL VOLUMETRIC FUEL GAUGE AVFI

Frame-mounted manual fuel gauge for use with TecQuipment's Engine Test Sets (TD200 and TD300).

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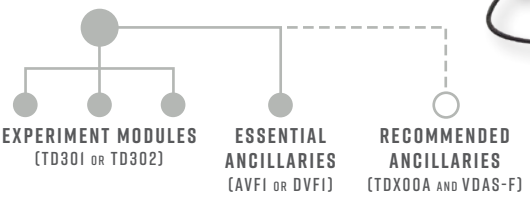
REGENERATIVE ENGINE TEST SET TD300 VDAS®

This floor-mounted engine test set, with bench and instrumentation frame, offers the most advanced student investigations into engine performance from TecQuipment. The four-quadrant drive absorbs more power, higher levels of accuracy, has improved speed stability and settles quicker, saving time in the laboratory. Includes extensive instrumentation for comprehensive investigations.

EXPERIMENT MODULES:

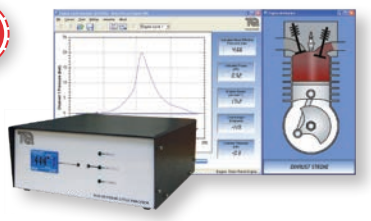
- Four-Stroke Petrol Engine (TD301)
- Four-Stroke Diesel Engine (TD302)

ESSENTIAL BASE UNIT (TD300)



ENGINE CYCLE ANALYSER ECA100

Hardware and software to measure internal combustion engine cylinder pressure and crank angle.



EXHAUST GAS CALORIMETER

TDX00A VDAS®

Experiment for use with TecQuipment's Engine Test Sets (TD200 and TD300) to measure the heat content of engine exhaust gases.

TRAINING AVAILABLE ON-SITE OR AT TECQUIPMENT HEADQUARTERS

Comprehensive equipment training is available from TecQuipment's team of specialist engineers.

Topics include:

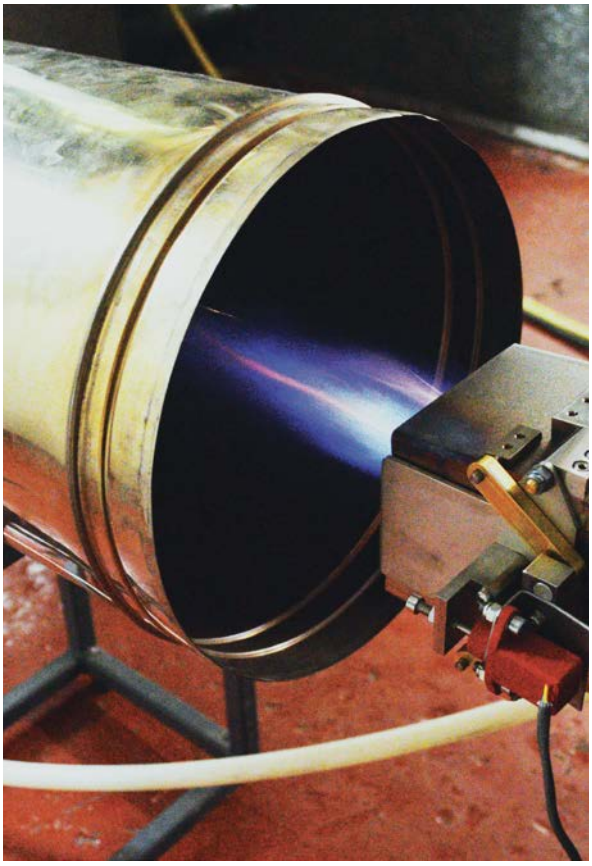
- Operation
- Safety
- Maintenance
- Introductory experimentation

TWO-SHAFT GAS TURBINE

GT185 ADA

Trolley-mounted, mobile apparatus that allows detailed experiments on how a two-shaft gas turbine works, and tests its performance.

PDF



TURBOJET TRAINER GT100 ADA

Trolley-mounted, mobile apparatus that allows detailed experiments on how a single-shaft gas turbojet works, and tests its performance.

PDF

TURBOJET TRAINER WITH REHEAT GT100RS ADA

Trolley-mounted, mobile apparatus that allows detailed experiments on how a single-shaft gas turbojet with reheat (afterburner) works, and tests its performance.

PDF

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ENVIRONMENTAL CONTROL

COOLING
HUMIDITY
REFRIGERATION
AIR CONDITIONING
HVAC & R

COOLING TOWERS EC1000V

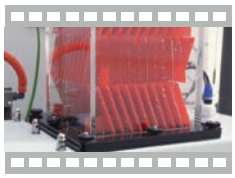
VDAS ONBOARD

Benchtop apparatus that demonstrates the operation characteristics of an evaporative cooling tower.

AVAILABLE COLUMNS:

- Cooling Column Type A (EC1000a)
- Cooling Column Type B (EC1000b)
- Empty Cooling Column (EC1000c)
- Packing Characteristics Column (EC1000d)

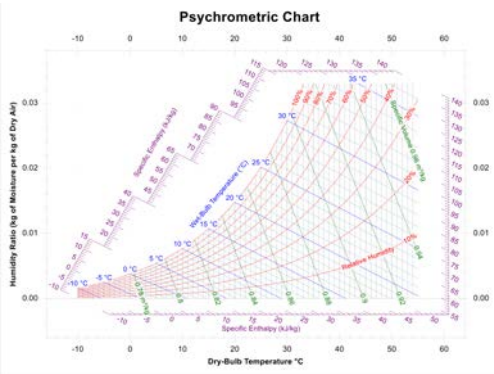
PDF



DOWNLOADS

A pressure-enthalpy diagram and psychrometric chart for use with EC1000V, EC1501V and EC1550V can be downloaded at:

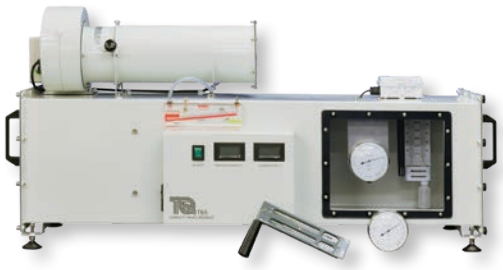
TECQUIPMENT.COM/DOWNLOADS



HUMIDITY MEASUREMENT TE6

Benchtop apparatus that illustrates the principles of humidity measurement and compares various methods of measurement.

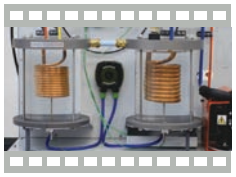
PDF



REFRIGERATION CYCLE

EC1500V VDAS ONBOARD

Benchtop apparatus that allows students to investigate and observe the stages of refrigeration, such as the coefficient of performance, superheat and subcooling.

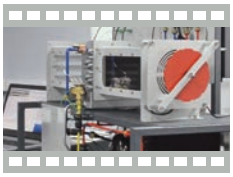


PDF

AIR CONDITIONING TRAINER

EC1501V VDAS ONBOARD

Benchtop apparatus that allows students to investigate the fundamental principles of air conditioning, including enthalpy change in the air flow.



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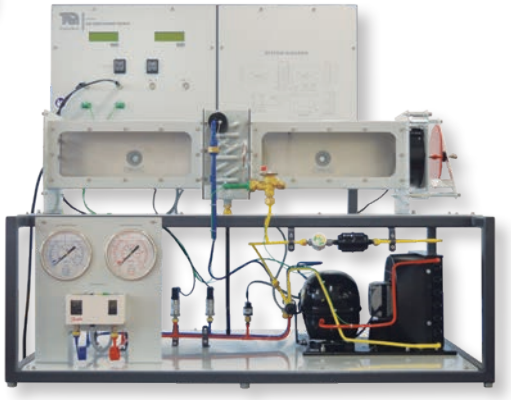
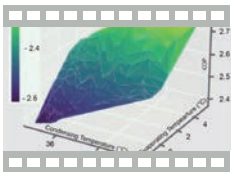


ADVANCED HVAC & R TRAINER EC1550V

VDAS ONBOARD

A versatile floor-standing apparatus for the in-depth study of heating, ventilation, air conditioning and refrigeration (HVAC & R) systems. Facilitates the analysis of individual and combined psychrometric processes commonly used in air conditioning. Also allows study of the vapour compression refrigeration cycle, including the use of pressure enthalpy (P-h) charts.

PDF



BASE UNIT (EC1550V) FITTED WITH THE OPTIONAL RECIRCULATION DUCT AND ENVIRONMENTAL CHAMBER

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ALTERNATIVE ENERGY

HYDRO

WIND

SOLAR PHOTOVOLTAIC

SOLAR THERMAL

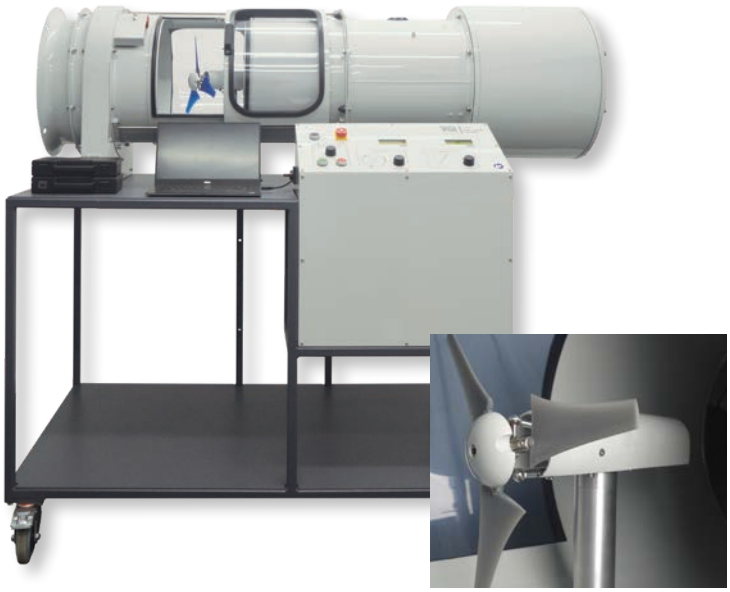
NEW

HYDRO-ELECTRIC TURBINE

AE1000V VDAS ONBOARD

The TecQuipment Hydro-Electric Turbine is a versatile, floor-standing, self-contained apparatus for demonstration of hydro-electricity. It is supplied with five different propellers. The product focuses on exploring the best efficiency point of different propellers and perform energy audits to analyse system performance.

PDF



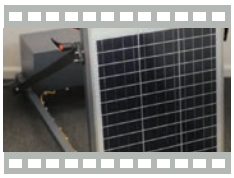
WIND TURBINE DYNAMICS AE1005V VDAS ONBOARD

This is a versatile, compact apparatus for teaching the fundamentals of kinetic wind energy conversion into electrical power. Flexibility is at the core, it has a castor-mounted frame for mobility and functionality and allows students to 3D-print their own blades for advanced experimentation.

PDF

PHOTOVOLTAIC CELLS TE4 VDAS®

Floor-standing mobile apparatus with instrumentation, includes high and low-capacity batteries. It illustrates how effective photovoltaic cells are in capturing solar energy.

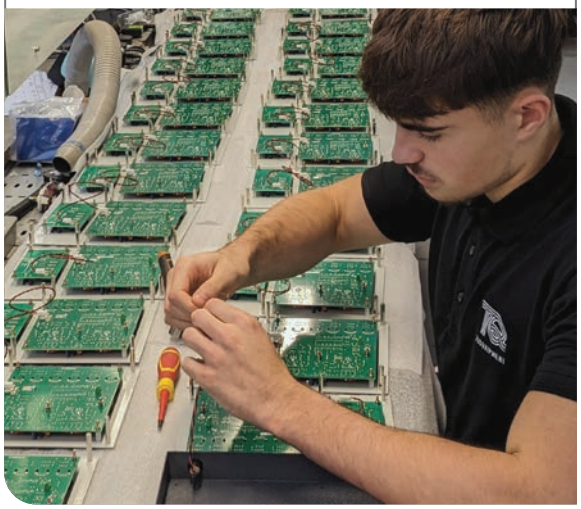


SOLAR LIGHT BANK TE4A

Floor-standing apparatus with 15 tungsten halogen lamps consuming up to 6 kW of power.

QUALITY CONTROL WITH IN-HOUSE PRODUCTION

To maintain high quality and keep lead times to a minimum, products are designed and manufactured all under one roof at the TecQuipment headquarters based in the UK.



FOCUSING SOLAR ENERGY COLLECTOR

TE38 VDAS®

Floor-standing mobile apparatus that illustrates the workings of a focusing solar energy collector and allows students to study its performance. Supplied with four sizes of absorber.

FLAT PLATE SOLAR THERMAL ENERGY COLLECTOR TE39 VDAS®

Floor-standing, folding mobile apparatus with instrumentation that illustrates the workings of a flat plate solar energy collector and allows students to study its performance.

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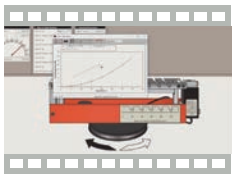
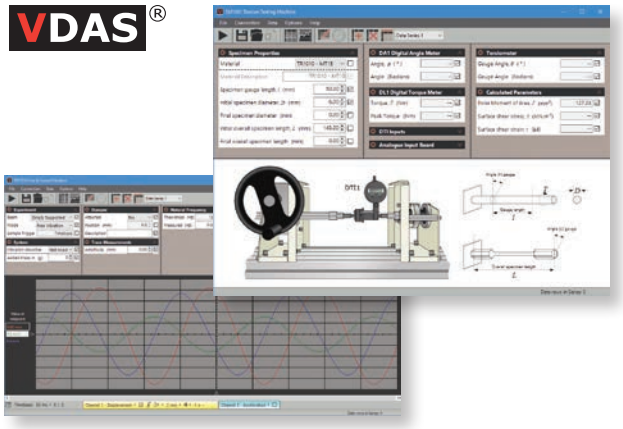
VERSATILE DATA ACQUISITION SYSTEM

VERSATILE DATA ACQUISITION SYSTEM (VDAS®)

VDAS® is a high capacity, accurate, efficient and user-friendly automatic data acquisition hardware and software package that works with a growing list of over 90 TecQuipment products, enabling real-time display and capture of experiment data.

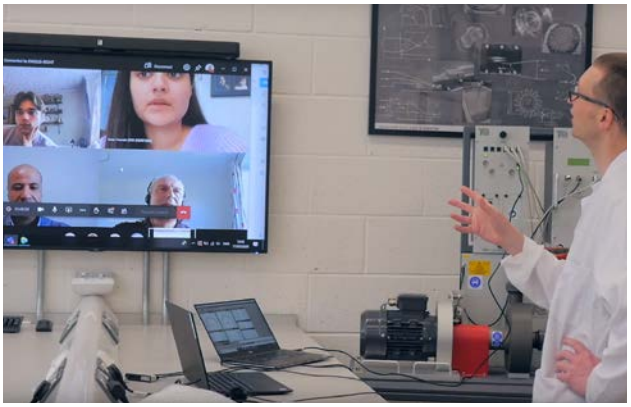


VDAS® FAMILIARISATION

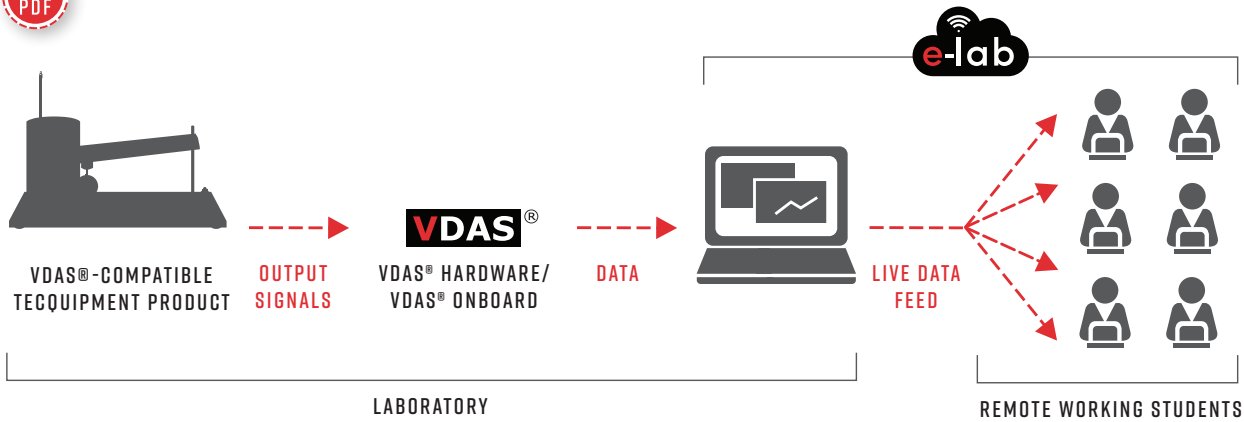


A REMOTE WORKING SOLUTION: VDAS® e-lab

VDAS® e-lab is software that works with TecQuipment's VDAS®-enabled products that can be used remotely, allowing students to interactively engage and participate in laboratory experiments for an adaptable, blended learning approach.



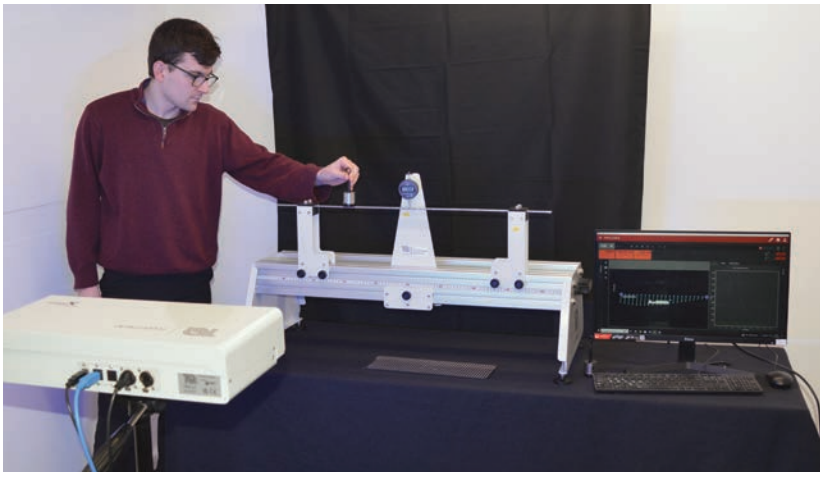
Live experimental data direct from the laboratory can be processed by an unlimited number of remote students.



OPTICAL EXTENSOMETRY

DEFLEX®

A digital image correlation (DIC) system to teach students how to measure and visualise surface deformations, strains and displacements in materials and shapes.

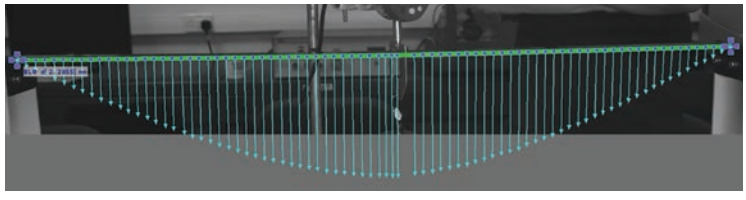


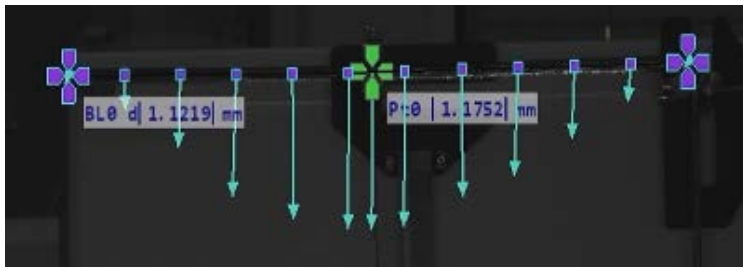
DefleX® is a contactless digital technique to help students learn how to measure and analyse deformations of objects optically. It is equipped with camera measurement and image processing software for analyzing motions, displacements and strains. It can measure visible features on objects and material surfaces like screws, joints, edges, grooves and composite structures.

The system uses DefleX® software which can be licensed for educational use (DefleX®-Edu), or for grant-funded research purposes up to TRL5 (DefleX®-Pro).

DEFLEX® POSTER

The DefleX® camera can measure objects at different distances using a range of suitable and interchangeable lenses.





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GENERAL-PURPOSE ANCILLARIES AND INSTRUMENTS

The following items are ancillaries to some of the products and product ranges in this catalogue. Some will only work with TecQuipment products, while others will also work as general-purpose laboratory equipment.

OSCILLOSCOPES

DUAL BEAM STORAGE OSCILLOSCOPE H405A*

A two-channel 50 MHz digital storage oscilloscope.

Works with several TecQuipment products and is good for general-purpose use.

OSCILLOSCOPE OSI*

A dual-channel 50 MHz digital oscilloscope.

Works with several TecQuipment products and is good for general-purpose use.

PRESSURE INSTRUMENTS

COMPRESSOR CE1B*

Air compressor and reservoir to provide air for the CE107 Engine Speed Control Apparatus.

STROBOSCOPES AND TACHOMETERS

STROBOSCOPE STI

A portable digital stroboscope for general laboratory use, such as speed measurement and motion studies.

Works with several TecQuipment products.

OPTICAL TACHOMETER OTI*

A hand-held, battery-powered optical tachometer with a digital display and a speed range of 3 to 99999 rev.min–1 (rpm). It works with reflective surfaces or stick-on reflective tape.

Works with several TecQuipment products and is good for general-purpose use.

BENCHES

WORK BENCH WBI

TecQuipment's sturdy work bench is suitable for use with most benchtop products.

* Please contact TecQuipment or the local distributor for the latest specification.

HERE TO HELP YOU

A team of specialist customer care personnel are available to answer a range of question relating to technical details, spare parts and maintenance:
CUSTOMER.CARE@TECQUIPMENT.COM

PRODUCT LIST

This is a list of our main line items so some ancillary products may not appear. Please refer to the main line item to find any ancillaries (for example, to find H40a look at H40). Alternatively, check our website at TECQUIPMENT.COM or contact our expert Sales team.

CONTACTING TECQUIPMENT

PURCHASE ENQUIRIES

For all purchase enquiries please contact the local agent or email: SALES@TECQUIPMENT.COM

Purchase enquiries can be:

- Requests for data sheets, catalogues and further information
- Technical advice for product selection prior to purchase
- Prices and quotations

AFTER SALES

There is a dedicated team of people at TecQuipment that are committed to providing a high level of after-sales care and support to all our customers, past and present.

No matter how old the equipment is, we continue to provide support.

For all after-sales queries please contact: CUSTOMER.CARE@TECQUIPMENT.COM or use the forms on our website at: TECQUIPMENT.COM/CONTACT

After-sales queries can be:

- Requests for manuals and user guides
- Quotations for spares and consumables
- Post-sales technical advice and support

SALES PARTNERS

To find the contact and company details for your local TecQuipment representative visit our website at: TECQUIPMENT.COM/SALES-PARTNERS

MR SAW TUN, LECTURER, SINGAPORE POLYTECHNIC

CASE STUDY

MATERIALS TESTING | ENGINEERING SCIENCE | STATICS FUNDAMENTALS

BEDFORD COLLEGE'S PRODUCT EXPANSION FOR CONSTRUCTION AND ENGINEERING COURSES

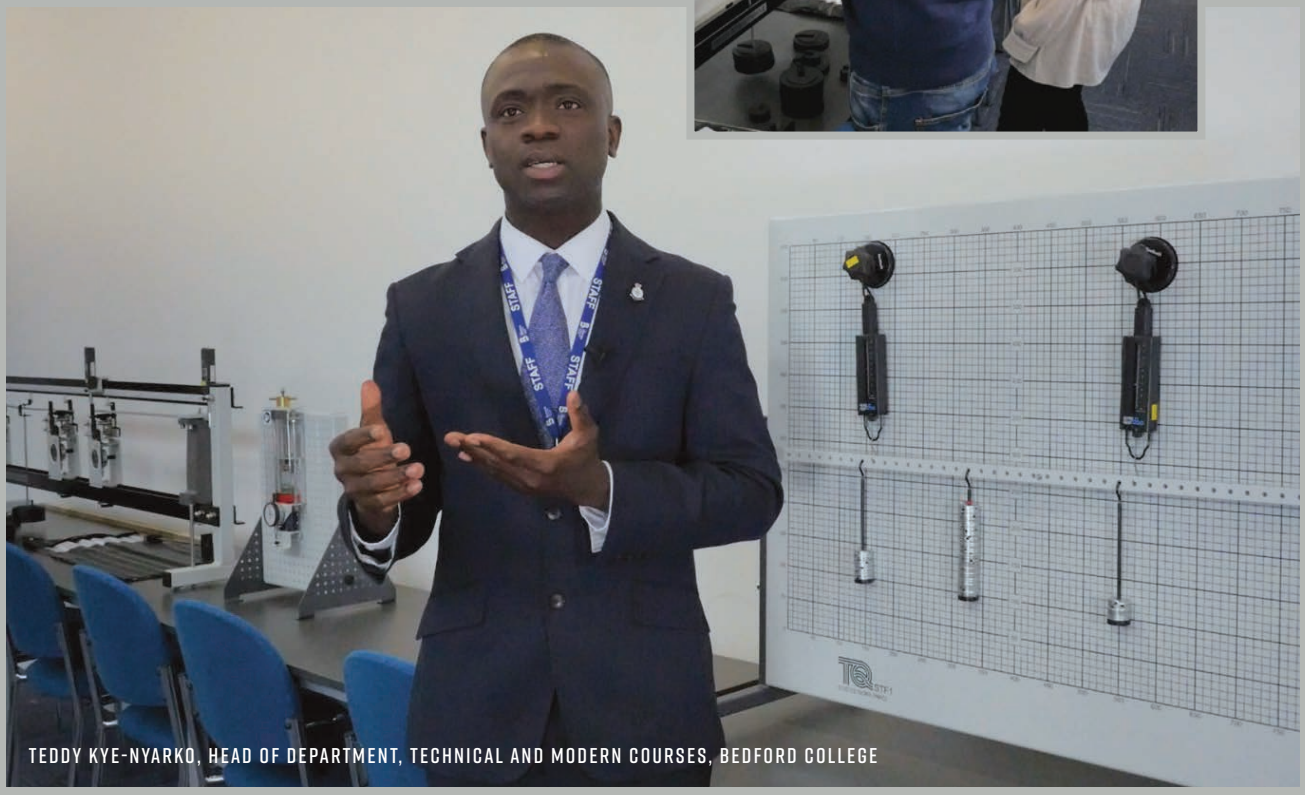
Bedford College's head of department for technical and modern courses, Teddy Kye-Nyarko, shared insights into their extensive TecQuipment product range investment and the positive experience they had both in purchasing the products and with the construction and engineering students using the equipment.

Specialising in construction and engineering courses, Bedford College has been a longstanding user of TecQuipment products, recently acquiring a new batch of apparatus to enhance their teaching methodologies.

Key products employed in their curriculum include:

- Beam Apparatus (SM1004)
- Euler Buckling Apparatus (SM1005)
- Universal Testing Machine (SM1000)
- Strain Gauge Trainer (SM1009)
- Engineering Science Work Panel (ES1) and Tensile Tester Kit (ES6)
- Strain Gauge Kit (E19)
- Statics Work Panel (STF1), and more.

The flexibility of customer support, whether through online communication or on-site assistance, demonstrated TecQuipment's commitment to ensuring a seamless experience for educators. For students it is the convenience of the product user guides, which are designed to be user-friendly and include exercises that facilitate easy integration into the coursework. They eliminate the need for additional preparation and allow students to spend more time hands-on learning in practical labs.



TEDDY KYE-NYARKO, HEAD OF DEPARTMENT, TECHNICAL AND MODERN COURSES, BEDFORD COLLEGE

CASE STUDY

AERODYNAMICS | FLUID MECHANICS | THERMODYNAMICS

DRIVING AEROSPACE ENGINEERING AND THERMO FLUID SCIENCE COURSES AT KENT STATE UNIVERSITY

Driven by a commitment to excellence and with a vision to establish a robust program in aerospace engineering and thermal fluid sciences, Dr Aziz explored various product options before deciding to integrate TecQuipment's teaching apparatus into Kent State University's cutting-edge curriculum and recently inaugurated state-of-the-art Aeronautics and Engineering building.

Kent State's aerospace engineering program, led by Dr Aziz, boasts a thermo fluids sciences lab equipped with an array of TecQuipment apparatus. This includes products such as:

- Bernoulli's Theorem (H5)
- Flow Measurement (H10)
- Ideal Gases – Boyle's Law (TD1000)
- Viscosity and Particle Drag (H410)
- Centre of Pressure (H11)
- Osborne Reynolds Apparatus (H215), and more.

The lab also incorporates heat transfer apparatus for both linear and radial heat transfer, enhancing the understanding of fundamental principles.

The lab sessions cover a range of experiments each week, providing hands-on experience in fluid mechanics, heat transfer and thermal dynamics.

TecQuipment's Subsonic Wind Tunnel (AF1300) is also used in a separate research-focused lab for applied fluid dynamics. It serves as a valuable tool for testing model aircraft and various geometries, enabling students to explore aerodynamics applications. One notable experiment involves studying the effect of winglet configurations on model airplanes, providing valuable insights into aerodynamic performance.

Kent State University's collaboration with TecQuipment solidifies its commitment to providing students with an outstanding learning experience focused on a comprehensive and practical understanding of aerospace engineering. The success of Dr Aziz's thermal fluids laboratory serves as a testament to TecQuipment's pivotal role in advancing the next generation of engineers.

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YORK COLLEGE OF PENNSYLVANIA'S ENTHUSIASM FOR TECQUIPMENT'S FLUID MECHANICS PRODUCTS

At York College of Pennsylvania in the Civil and Mechanical Engineering Department, the enthusiasm for fluid mechanics is palpable, with students frequently expressing awe at the impressive and user-friendly equipment provided by TecQuipment.

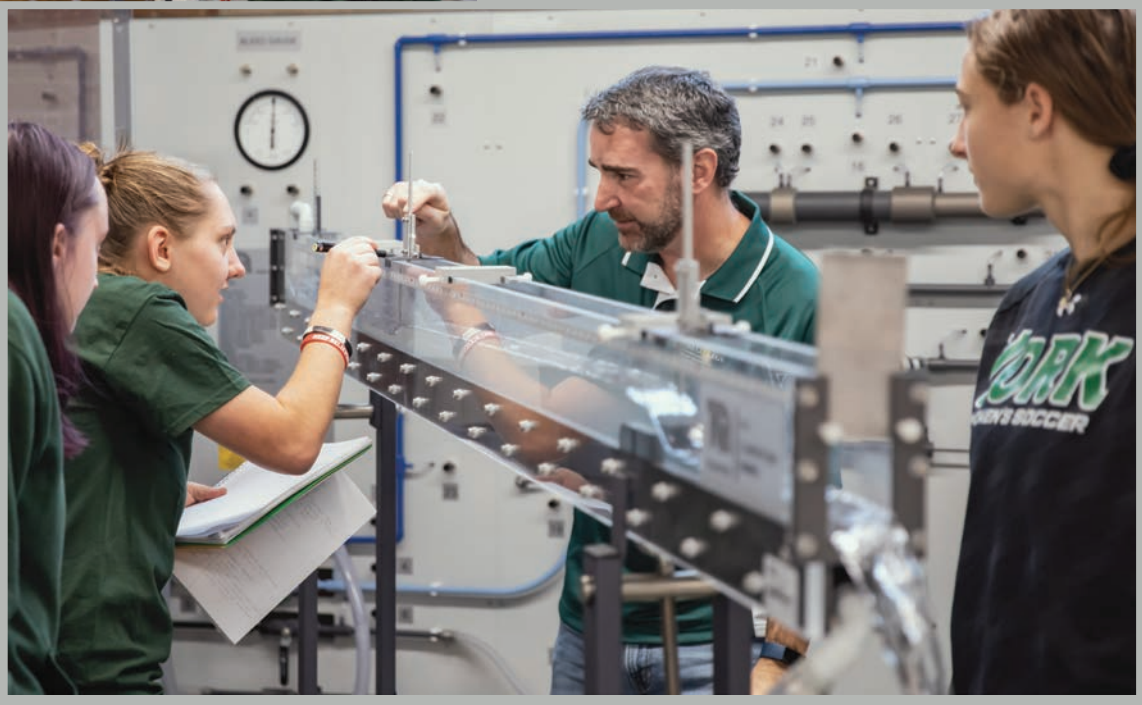
They emphasise the flawless performance of TecQuipment's equipment, praising its reliability during lab sessions. The equipment's ability to generate meaningful data without complications eliminates the need for extensive discussions on apparatus or equipment errors, allowing for a smooth and efficient learning experience.

TecQuipment's user guides receive high praise for their clarity, multiple usage options and inclusion of sample results, making them valuable teaching tools. They allow students to explore various experiments with the same equipment and provide a template for data collection, streamlining the learning process.

Students at York College of Pennsylvania thoroughly enjoy the equipment demos, finding the larger apparatus like the **Fluid Friction Apparatus** (H408), **Rainfall Apparatus** (H313) and **Flume** (FC50) particularly impressive. The civil engineering course, structured to introduce various sub-disciplines, incorporates fluid mechanics, hydraulics, and hydrology, providing students with a well-rounded education that is focused on real-world applications of civil engineering.

TecQuipment's **Hydrology and Rainfall Apparatus** (H313) proves invaluable for teaching concepts related to stormwater and detention basins. The **Discharge Over a Notch apparatus** (H6) aids in studying different outlet structures, preparing students for challenges in water resource engineering.

TecQuipment's dedication to providing quality equipment and exceptional support for the products purchased play a pivotal role in shaping the fluid mechanics curriculum at York College of Pennsylvania and its educational goals.



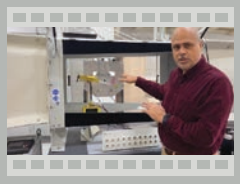
CASE STUDY

AERODYNAMICS

EXPLORING NAZARBAYEV UNIVERSITY'S AEROSPACE RESEARCH WITH TECQUIPMENT'S SUBSONIC WIND TUNNEL (AF1600S)

Discover how Nazarbayev University in Kazakhstan uses TecQuipment's Subsonic Wind Tunnel (AF1600S) to conduct unique experiments in aerospace engineering. Led by Associate Professor Basman Elhadidi and his students, the university's Department of Mechanical and Aerospace Engineering utilises this apparatus to delve into aerodynamics, flight performance and flight dynamics.

The Subsonic Wind Tunnel (AF1600S) offers unparalleled flexibility, equipped with a force balance for measuring lift, drag and pitching moment, alongside a versatile data acquisition system. From introductory studies on aerofoil characteristics to advanced experiments in aircraft trim, performance and control, students engage in hands-on learning that bridges theoretical concepts with practical applications.



Through innovative experiments, such as demonstrating aircraft trim and performance, students gain a deeper understanding of flight mechanics, performance dynamics and longitudinal flight modes. The wind tunnel's adaptability allows for custom-designed models and real-time data capture, enriching the learning experience and preparing students for real-world challenges in aerospace engineering.

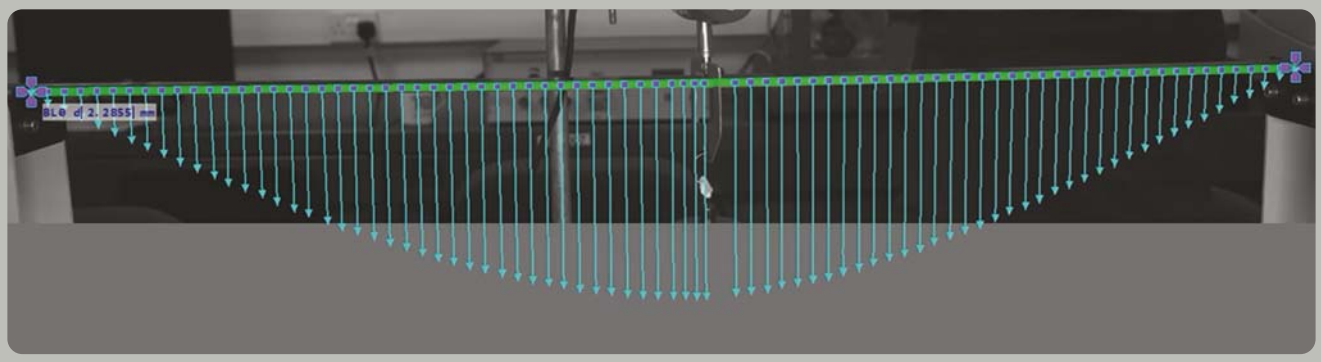
Associate Professor Elhadidi emphasises the importance of this apparatus in integrating theory with application, providing students with invaluable insights into aerodynamics and flight behaviour. As Nazarbayev University continues to pioneer aerospace research, the Subsonic Wind Tunnel (AF1600S) serves as a cornerstone in nurturing students' curiosity and innovation, propelling them towards future success in the field.

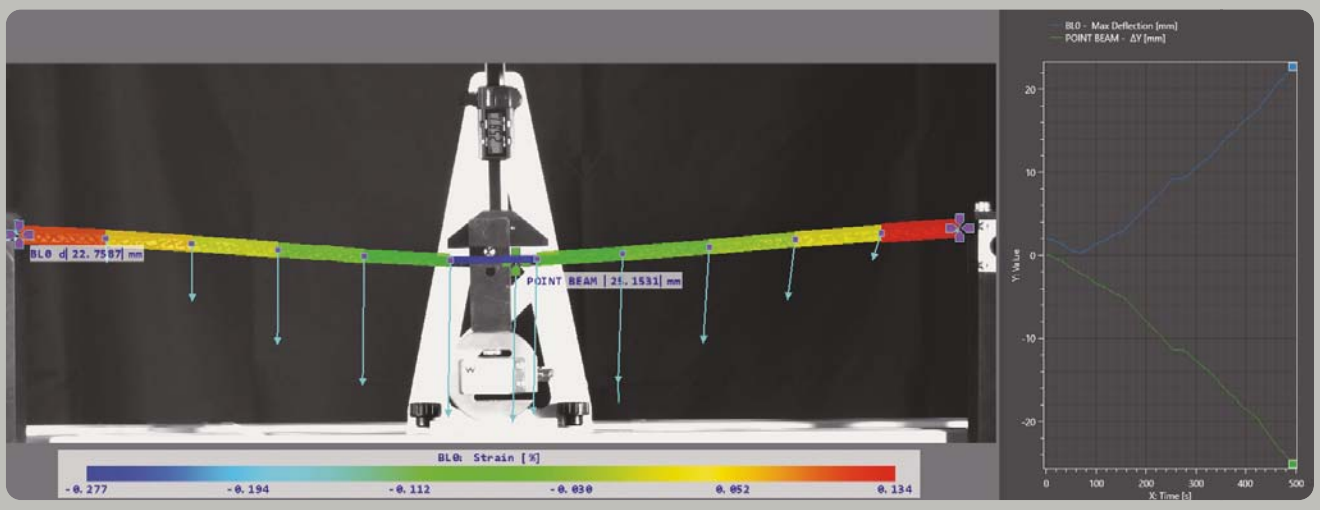
NEW

OPTICAL EXTENSOMETRY

DEFLEX®

Visualise and measure strain, displacements, extentions and deformations in materials, shapes and structures.





TECQUIPMENT.COM/OPTICAL-EXTENSOMETRY

INTERACTIVE
DIGITAL VERSION

Front cover: Universal Testing Machine Cupping Experiment (SM1000h)

Back cover: Engineering Science Drive Systems Kit (ES11)

TecQuipment Ltd, Bonsall Street, Long Eaton, Nottingham NG10 2AN, UK

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