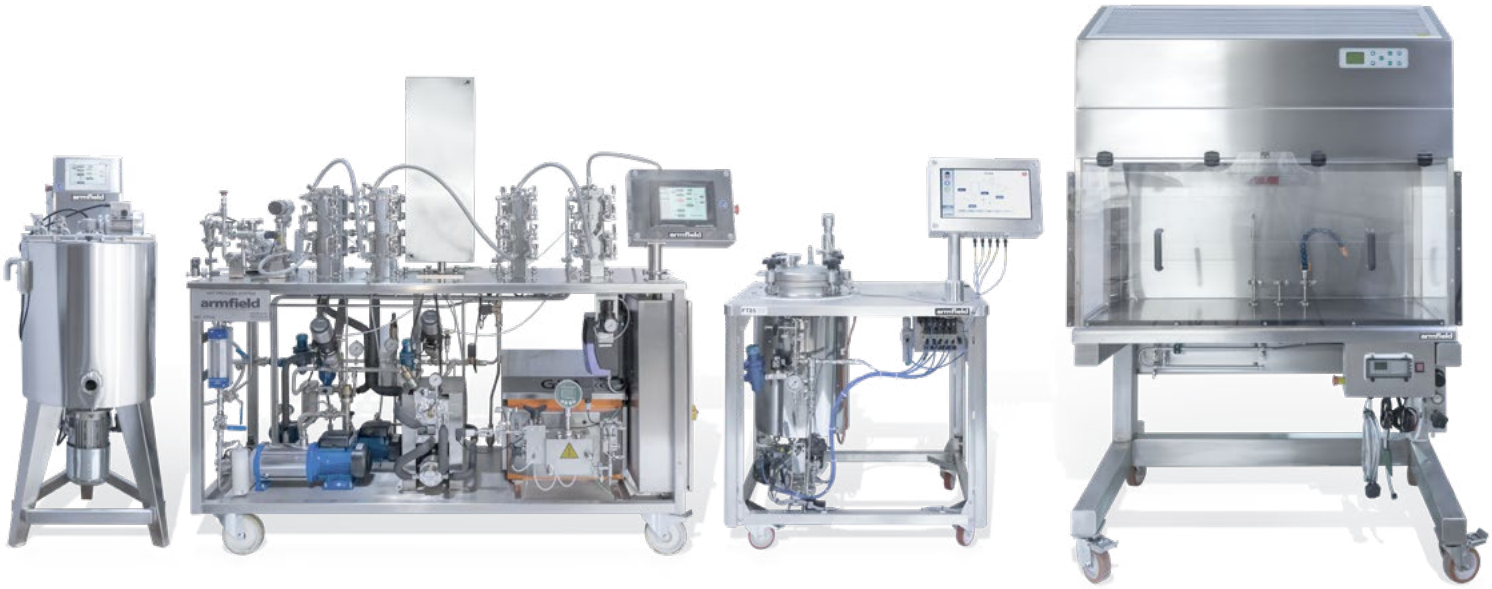
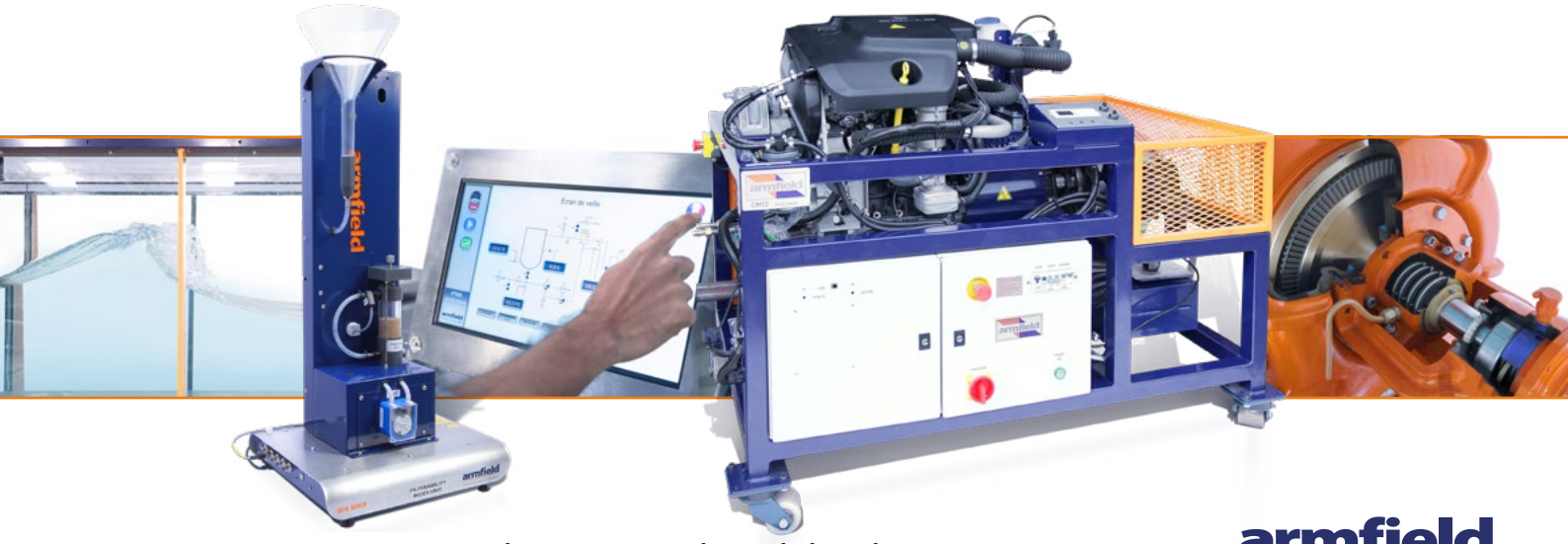
armfield

ENGINEERING
teaching and research

CATALOGUE – ISSUE **2**





Innovative engineering teaching, research and development equipment

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An ISO 9001 Company Part of Judges Scientific PLC

Welcome to our catalogue

What's new

This Catalogue introduces complete new ranges of educational equipment demonstrating the fundamentals of engineering with a student-based learning approach. These products can be found within the new EF and ME sections of our catalogue.

We have continued to innovate our product portfolio by introducing new products for Open Channel Research Flumes, Air Conditioning, Water Treatment, Fluid Mechanics, Filtration and Food Technology. As part of this innovation we are proud to introduce our new ArmBus software, unparalleled in the market. ArmBus provides an ultimate user experience with its instinctive simplicity including options for automatic fault diagnosis, network access, remote operation and multiple user interfaces.

History, Mission and Culture

Since our inception in 1963 Armfield has been a proud, independent and responsible provider of technical equipment. Today, Armfield is the world leader in the supply of innovative Education Equipment and Industrial Research & Development equipment for Food, Pharmaceutical and Industry labs.

People are at the core of our company. We see our strength in trust, diversity and progress. Every Armfield employee's contribution, no matter how big or small, forges the success of our organisation with the customer placed at the very heart of our business.

Our equipment allows users to educate, test and research in innovative ways that fit their individual needs, while at the same time providing cost-effective, reliable and user-friendly products.

Armfield has built its reputation on a commitment to providing quality products and services while rapidly responding to international needs for innovative and accurate educational and industrial equipment. A primary strategy is superior customer satisfaction. Armfield constantly analyses market, product and curriculum needs around the world to develop a full range of products for education and industrial research.

With our focus on delivering meaningful innovation and content, we serve multiple markets throughout the world in the areas of High Schools, Universities and Industrial Processing. We are a leader in Fluid Dynamics, Chemical, Civil, Mechanical Engineering, Food and Pharmaceutical Processing.

If you require more detailed data on any of the products contained within this catalogue we are represented by a global network of agents, distributors and an interactional sales team who will be more than happy to support your requests. You will find our comprehensive list of agents and distributors on our website.

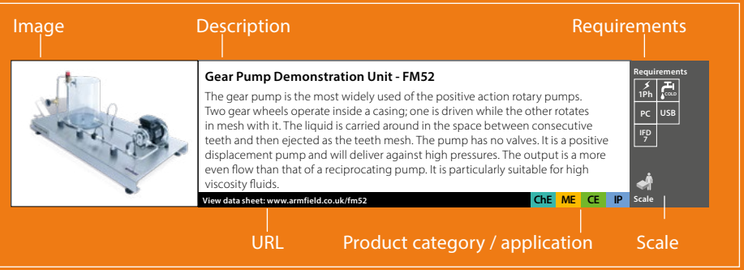
Daniel Whitehouse

MD – Armfield Ltd
Part of Judges Scientific plc

Product details

Each product entry has an image, brief description and graphical quick-view of requirements and relative product scale.

For more detailed information, the full technical data sheet can be viewed, downloaded or printed via the URL that accompanies each entry.



ENGINEERING teaching and research

Table of Contents

armfield
Engineering Fundamentals

EF SERIES

Part of a comprehensive range of engineering topic trainers

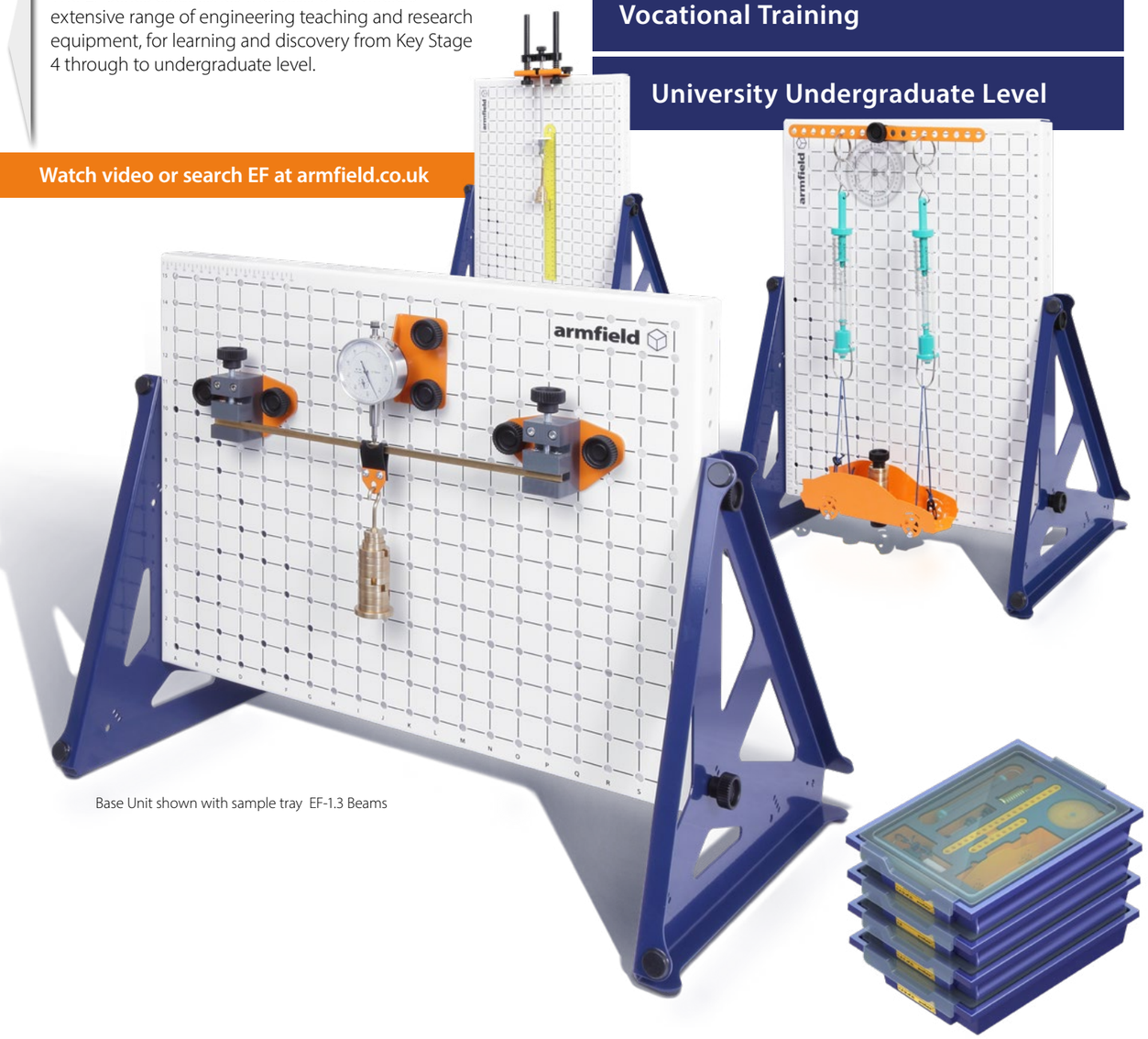
Provides students with a solid grounding in engineering fundamentals!

The EF series establishes the basis of Armfield's extensive range of engineering teaching and research equipment, for learning and discovery from Key Stage 4 through to undergraduate level.

Perfect for the following levels

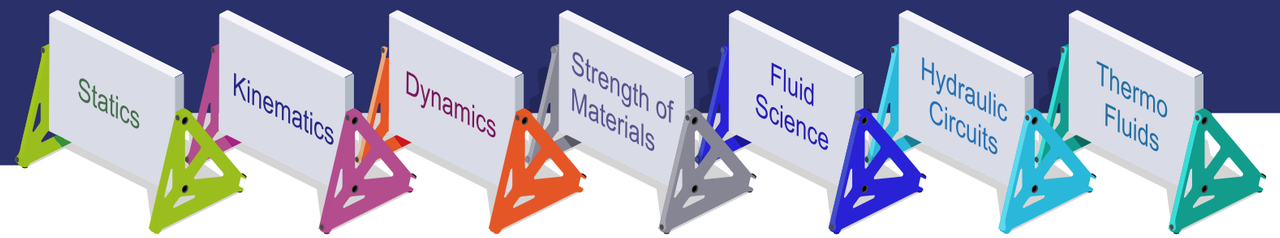
- STEM
- Schools & Colleges
- Vocational Training
- University Undergraduate Level

Watch video or search EF at armfield.co.uk



Base Unit shown with sample tray EF-1.3 Beams

Example of the experiment trays stacked



EF Chapters / Topics / Experiments

The Modular hands-on tray based system is supplied in conjunction with a multifunctional Base Unit enabling the student to conduct their own experiments in subjects such as Statics, Dynamics and Kinematics. Using easy to follow instructions experiments can be conducted individually or in front of a class.

Choose your topic, build and conduct experiments with our easy instructions and manuals, record the outcome!

- Simple graphical instructions enable the rapid assembly of all experiments
- Supplied with a detailed instruction manual, covering the theory of beams including multiple practical experiments designed to further develop the students' understanding in this field
- Hands on Learning

Work Station - EF-WS

Each EF set is supplied in one or more protective storage trays for storage in the racks of the optional EF-WS Workstation.

Please note: this is a wheeled storage unit only, shown here with various trays and multiple Base Units to illustrate its capacity and use as a work surface or workstation. Discounts are available for multiple units and multiple trays when purchased together. Ask your Armfield Agent for more details.

Requirements

View data sheet: www.armfield.co.uk/ef ChE ME CE IP

Scale

Base Unit - EF-BU

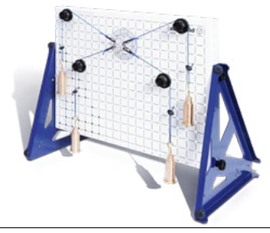
The base unit EF-BU is easy to set up with no assembly tools needed. Screen-printed design includes a measuring scale to ensure repeatable exercises. The base unit can be set up horizontally, vertically and in an inclined position to suit experiment.

Requirements

View data sheet: www.armfield.co.uk/ef ChE ME CE IP

Scale

STATICS



Statics / Forces - EF-1.1

The EF-1.1 - Forces experiment kit enables students to understand the centre of gravity of different shapes and analysis of forces in equilibrium for concurrent and non-concurrent force.

Requirements

EF-BU

View data sheet: www.armfield.co.uk/ef ChE ME CE IP

Scale

STATICS

Statics / Moments - EF-1.2

The EF-1.2 - Moments experiment kit enables students to understand the relationship of weights and beam balance. The different configuration is possible to enhance understanding of the principles of moments, levers, beams and the relationship of distance and forces applied on a beam.

Requirements

EF-BU

View data sheet: www.armfield.co.uk/ef ChE ME CE IP

Scale

Applications

ChE	ME	CE	IP
Chemical Engineering	Mechanical Engineering	Civil Engineering	Industrial Processing

Requirements

EF-BU

Statics / Beams - EF-1.3

The EF-1.3 - Beams experiment kit enables students to analyse the behaviour of different types of beams under a variety of load conditions and also build and test a selection of portal and truss frames.

Scale

View data sheet: www.armfield.co.uk/ef ChE ME CE IP

STATICS

Requirements

EF-BU

Statics / Springs - EF-1.4

The EF-1.4 - Springs experiment kit enables students to learn about Hooke's law when applied to both extension and compression springs. Students can experiment with a single spring, springs in series or in parallel. A variety of compression springs are included to enable students to learn about spring rates.

Scale

View data sheet: www.armfield.co.uk/ef ChE ME CE IP

STATICS

Requirements

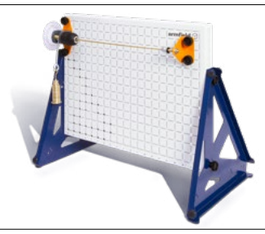
EF-BU

Statics / Torsion - EF-1.5

The EF-1.5 - Torsion experiment kit enables students to understand the relationship between torsion and the angle of twist for any given material.

Scale

View data sheet: www.armfield.co.uk/ef ChE ME CE IP



STATICS

Requirements

EF-BU

Dynamics / Simple Harmonic Motion - EF-2.2

The EF-2.2 - Simple Harmonic Motion experiments kit enables students to understand the effect of mass and length of pendulum on SHM and the period of oscillation. The relationship between SHM and gravity is evaluated using the Kater's pendulum, as well as understanding SHM in a mass spring system.

Scale

View data sheet: www.armfield.co.uk/ef ChE ME CE IP

DYNAMICS

Requirements

EF-BU

Kinematics / Simple Mechanisms - EF-3.2

The EF-3.2 - experiment kit enables students to visualise and understand the different types of mechanical systems and the conversion of linear motion to rotary motion and vice versa.

Scale

View data sheet: www.armfield.co.uk/ef ChE ME CE IP

KINEMATICS

Select a topic set and base unit
Build following the simple graphical build instructions
Experiment research, learn, development

armfield

Desktop Learning Modules

DLM SERIES

Small enough for the classroom; rigorous enough for the laboratory.

The DLMX represents the very best in modern engineering teaching equipment. The system is a highly visual learning tool that can be used to teach Heat Transfer, Fluid Mechanics and Thermofluids to students of all ages.

- Clear components used for maximum visibility of the equipments operation and function
- Computer controlled with integrated data logging

DLMX™ DESKTOP LEARNING MODULES

Applications

ChE	ME	CE	IP
Chemical Engineering	Mechanical Engineering	Civil Engineering	Industrial Processing

Requirements: COLD

DLMX Base Unit - DLMX

The Armfield DLMX system is a practical education system aimed at teaching students the basics of fluid mechanics, heat exchange and other fundamental engineering principles. It is a unique combination of coursework and practical demonstration equipment and can be used to teach students of all ages.

The equipment comprises a small battery operated base unit, into which one of seven different cartridges is plugged. The base unit contains a water reservoir, pump, controls and viewing panel.

Scale

View data sheet: www.armfield.co.uk/dlmx — ChE ME CE IP

Requirements: DLMX HOT

Cross Flow Heat Exchanger - DLM-1

This DLM-1 cartridge demonstrates the function of a fan and radiator to cool water. The DLMX reservoir is filled with hot water, which is pumped through the heat exchanger. The inlet and outlet water temperatures are measured to demonstrate the cooling effect. The relationship between heat transfer and water flow rate can also be investigated.

Scale

View data sheet: www.armfield.co.uk/dlmx — ChE ME CE IP

Requirements: DLMX COLD

Fluidised Bed - DLM-2

A highly visual demonstration of a fluidised bed. The onset of fluidisation can be demonstrated and the way the height of the bed varies with the flow rate. The pressure drop across the bed is measured, so the way the pressure varies before the onset of fluidisation and after fluidisation has occurred can be illustrated and compared to theory.

Scale

View data sheet: www.armfield.co.uk/dlmx — ChE ME CE IP

Requirements: DLMX COLD

Orifice Plate - DLM-3

The use of an orifice plate to measure flow is demonstrated by measuring the pressure drop across a defined orifice. The geometry of the orifice is in accordance with standard industrial orifice flow meters.

Scale

View data sheet: www.armfield.co.uk/dlmx — ChE ME CE IP

Shell and Tube Heat Exchanger - DLM-4

This DLM-4 cartridge requires two DLMX base units, one filled with hot water, and one filled with cold water. The inlet and outlet temperatures of both fluid streams are measured, enabling the heat transfer coefficient to be measured and an energy balance to be performed. The two flow rates can be individually varied and the flow direction through the shell can be easily changed. The internal geometry of the DLM-4 is based on industrial 2-1 shell and tube heat exchangers.

Requirements: DLMX x2 HOT

View data sheet: www.armfield.co.uk/dlmx

ChE ME CE IP

Scale

Tubular Heat Exchanger - DLM-5

This DLM-5 cartridge requires two DLMX base units, one filled with hot water and one filled with cold water. The inlet and outlet temperatures of both fluid streams are measured, enabling the heat transfer coefficient to be measured and an energy balance to be performed. Reversing the flow in the outer tube demonstrates the difference between co-current and counter-current operation.

Requirements: DLMX x2 HOT

View data sheet: www.armfield.co.uk/dlmx

ChE ME CE IP

Scale

Energy Losses in Hydraulic Systems - DLM-6

This DLM-6 cartridge simultaneously measures the pressure drop across a straight pipe, a smooth bend and a right angle bend. Each test section is of the same cross section and same effective length, enabling meaningful comparisons to be made. The additional energy losses due to the geometry of the flow path can be clearly seen at different flow rates and the relationship to theory can be established.

Requirements: DLMX COLD

View data sheet: www.armfield.co.uk/dlmx

ChE ME CE IP

Scale

Venturi System - DLM-7

The DLM-7 cartridge demonstrates the Bernoulli equation, showing how low pressure is generated in the throat of a Venturi tube, and how this is affected by flow. The flow recovery is also demonstrated by measuring the total pressure drop across the module. The geometry of the Venturi orifice is in accordance with standard industrial Venturi flow meters, so the use of a Venturi to measure flow can also be demonstrated.

Requirements: DLMX COLD

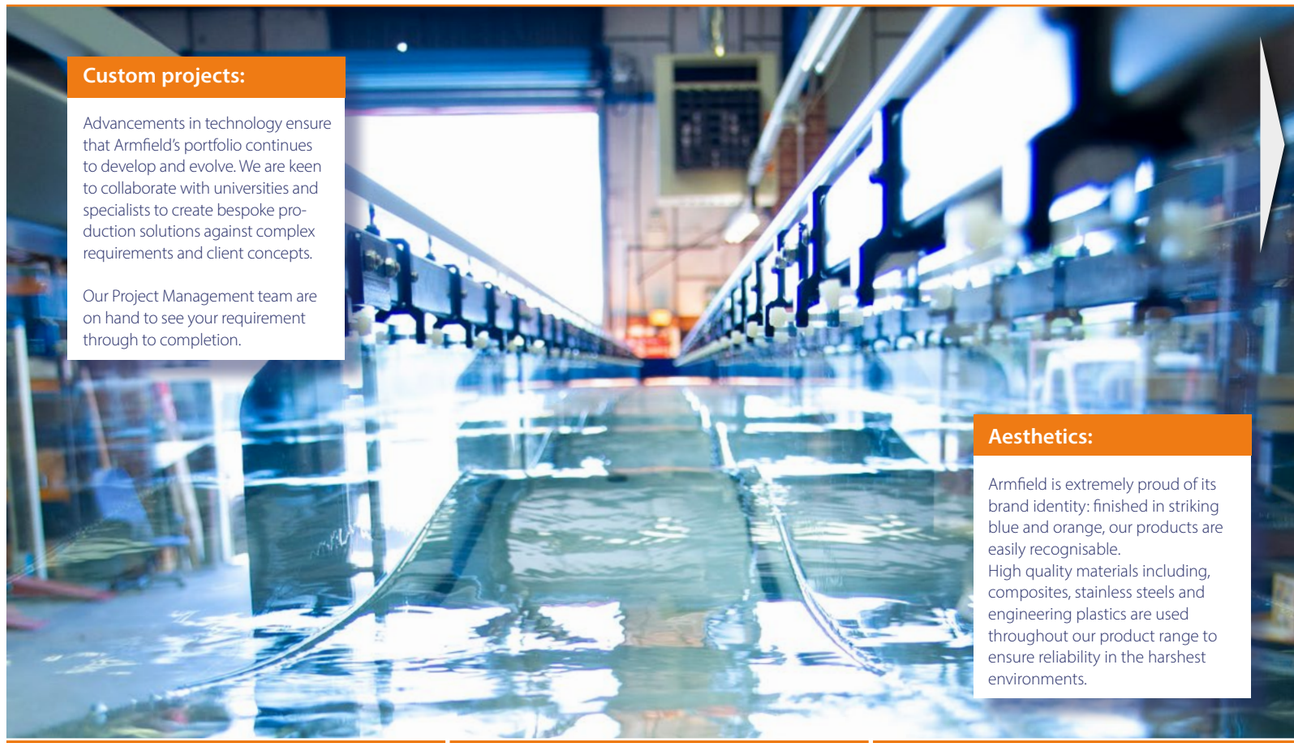
View data sheet: www.armfield.co.uk/dlmx

ChE ME CE IP

Scale

"Armfield's team of Engineers continue to build on a comprehensive portfolio of original and innovative designs. We are world leaders in educational products and flume technology for teaching and research, and pioneers of the 'Pilot Scale System' that allows industrial food technologists small-scale simulation of large-scale performance."

Our cutting-edge production facilities, talented engineers, software designers and installation team all work to ensure that top quality products are delivered to your facility, every time.



Custom projects:

Advancements in technology ensure that Armfield's portfolio continues to develop and evolve. We are keen to collaborate with universities and specialists to create bespoke production solutions against complex requirements and client concepts.

Our Project Management team are on hand to see your requirement through to completion.

Aesthetics:

Armfield is extremely proud of its brand identity: finished in striking blue and orange, our products are easily recognisable.
High quality materials including, composites, stainless steels and engineering plastics are used throughout our product range to ensure reliability in the harshest environments.

Design:

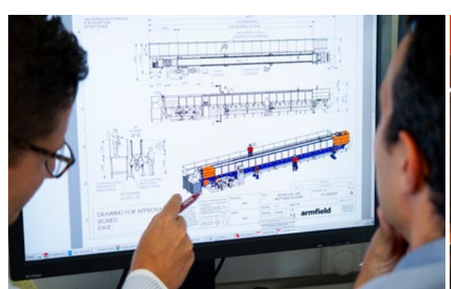
Products are conceptualised, developed and detailed using the latest computer-aided design software. Coupled with computational fluid dynamics (CFD) & Finite Element Analysis (FEA) and 3D-print prototyping, our design process helps to ensure products are right first time.

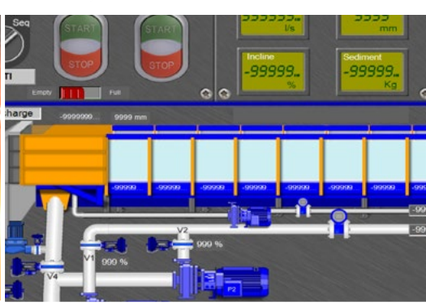
Manufacturing:

As an ISO 2015 certified business, Armfield strives for quality. We work continuously with our suppliers, contractors and production facilities to ensure that your product arrives on time, on budget and to specification.

Software:

Our customers require the best from the technology that drives their products. Armfield have developed a suite of control solutions, ranging from Industrial PLCs, to our highly regarded armSOFT data & control package and more recently, our new armBUS CAN-based data acquisition & control system.





armfield

Machine Elements

ME SERIES

The Armfield Machine Elements series introduces students to a range of commonly used mechanisms employed in machine design, mechanical engineering and design of machine elements.

Three-Speed Epicyclic Gearbox - SD4:18
The Sanderson Epicyclic Gear Unit

Applications

ME Mechanical Engineering

IP Industrial Processing

Weight Sets - SD-1.01/02/03
The Armfield weight sets details are on Page 75

Requirements

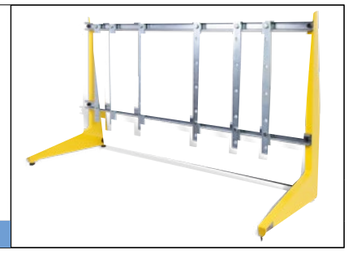
Scale

Universal Bench Mounted Frame - SD-1.10

The Armfield Didactec Sanderson Universal Bench Mounted Frame provides a very sensible alternative to wall mounting, particularly since many new buildings are predominantly glass, with very flimsy dividing walls.

The frame is designed to accommodate two items of ADS apparatus, allowing adequate space for students to work on each piece of equipment simultaneously.

View data sheet: www.armfield.co.uk/mechanical_engineering ME CE IP



Requirements

SD-1.01 x2 | SD-1.02 x2

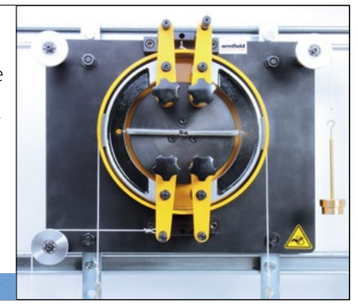
Scale

Drum Brake Apparatus - SD-1.12

This apparatus has been developed specifically for motor vehicle mechanics and motor vehicle technicians courses. It provides a means of demonstrating the difference in braking torque between leading (primary) and trailing (secondary) shoe braking systems and the effect on the braking systems and the effect on the braking torque of the various combinations of leading and trailing shoes. When the two shoes are linked together, the self-energising action can be demonstrated.

Options (A) Adjustable lining for **SD-1.12** (B) Full lining for **SD-1.12**

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP



Requirements

SD-1.02 x2

Scale

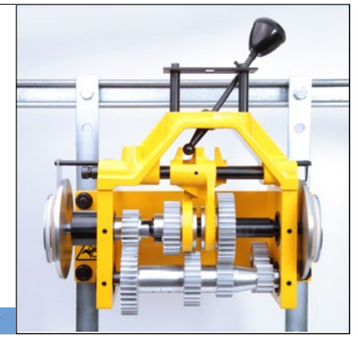
Gearbox Apparatus - SD-1.15

Most road vehicles are fitted with variable-ratio gearboxes as a means of obtaining the best power application under varying road conditions.

Fundamentally the gearbox consists of gear wheels of different sizes, which may be engaged as required. The sliding mesh box, although it is still used on heavy commercial vehicles, is seldom found on modern cars, but its basic construction and operation are important from the student's point of view as it represents the basic layout from which most modern gearboxes have been developed.

Option (A) Short coupling **SD-1.15A** (B) Universal joint coupling **SD-1.15B**

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP



Requirements

SD-1.02 x2

Scale

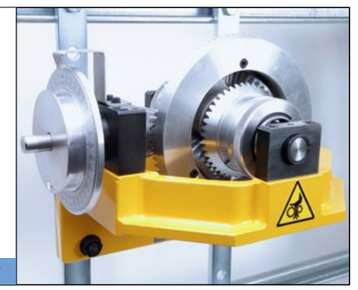
Crown Wheel & Pinion - SD-1.16A

Many students find it difficult to visualise the action of a differential when used as a means of providing a drive from the gearbox to each axle shaft while allowing independent motion between shafts.

The Sanderson Differential Unit has been designed to demonstrate the action of crown wheel and pinion rear axle drive and differential elements.

Option (A) Short coupling **SD-1.15A** (B) Universal joint coupling **SD-1.15B**

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP



Requirements

SD-1.02 x2

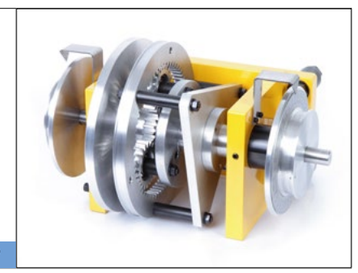
Scale

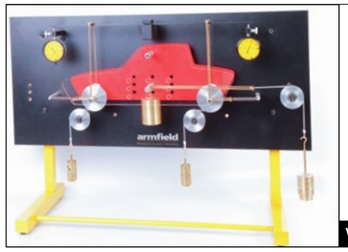
Overdrive Apparatus - SD-1.17

The Sanderson Overdrive Unit has been designed to demonstrate the action of the gear elements in simple epicyclic gear arrangements. The unit may also be used by students in the laboratory to carry out simple experiments on epicyclic gearing.

Option (A) Short coupling **SD-1.15A** (B) Universal joint coupling **SD-1.15B**

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP





Braking & Accelerating Forces Apparatus - SD-1.18

Under conditions of braking or acceleration of a road vehicle, a load transfer between front and rear wheels occurs. The problem of load transfer arises since the accelerating or braking force is not applied to the centre of gravity of the vehicle but to the point of contact of the wheels with the road.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements: SD-1.01 x2, SD-1.02 x2

Scale

Belt Friction Apparatus - SD-1.20

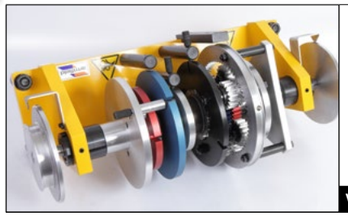
The Belt Friction Apparatus has been designed to allow students to carry out investigations to compare the driving torque for a given degree of overlap of a flat leather belt, a badly fitted 'V' belt and a correctly fitted 'V' belt.

Tension is introduced into the belt by hanging a mass from the ring attached to the end. The slipping torque is determined by the addition of a suitable mass attached to a cord wrapped around the drum.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements: SD-1.02 x2

Scale



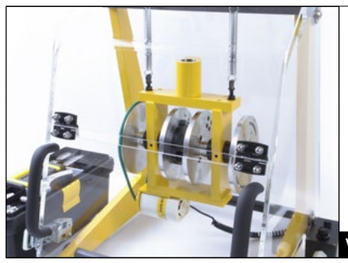
Borg-Warner Automatic Transmission Simulator - SD-1.22

The simplicity of operation and the ease with which the student may understand the Mechanical Power Flow in the Borg-Warner 35 gearbox has made the Sanderson simulator extremely popular with lecturers and students alike, in Technical Colleges throughout the world.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements: SD-1.02 x2

Scale



Static & Dynamic Balancing Apparatus - SD-1.23

The Dynamic Balancing Apparatus may be used effectively in both the classroom and the laboratory for simple demonstrations and experiments in the dynamic balancing of rotating and reciprocating systems.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements

Scale

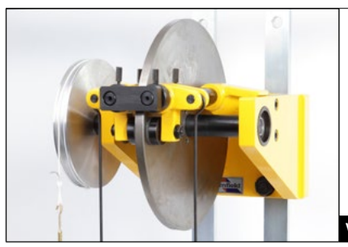
Plate Clutch Apparatus - SD-1.24

The Plate Clutch Apparatus has been designed specifically for motor vehicle technician courses. It provides a means of demonstrating the effect of the mean radius of the friction surfaces and the spring pressure on the torque transmitted by a plate clutch.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements: SD-1.01 x2

Scale



Disc Brake Apparatus - SD-1.25

The Disc Brake Apparatus has been designed specifically for motor vehicle courses and may be used effectively for classroom demonstrations. It may also be used by the student in the laboratory to carry out simple experiments to investigate the relationship between the normal force acting on the brake pads and the braking torque.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements: SD-1.02 x2

Scale

Crank Mechanism - SD-1.28

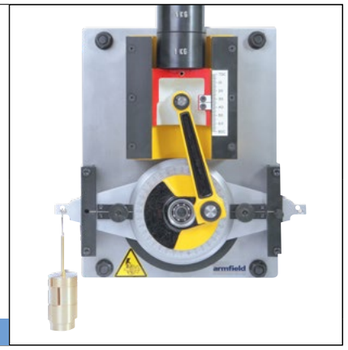
The apparatus is intended to represent a simple engine mechanism and may be used by the students for simple experiments to investigate:

- The relationship between the piston displacement and the crank angle for a given connecting rod/crank radius ratio
- The relationship between the turning moment on the crank shaft and the crank angle for a given force on the piston

View data sheet: www.armfield.co.uk/mechanical_engineering ChE ME CE IP

Requirements: SD-1.02 x1

Scale



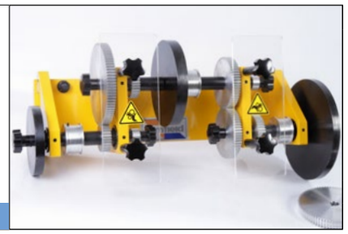
Acceleration of Geared Systems - SD-4.15

The Geared System essentially consists of three shafts, each mounted on ball races, supported in a suitable frame and connected by gearing. Alternative interchangeable gear ratios are supplied.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements: SD-1.02 x1

Scale



Coupled Epicyclic Unit - SD-4.17

The Epicyclic Gear Units have been developed to enable students to carry out investigations concerning epicyclic gearing in simple and more advanced forms. A version of this apparatus is the Sanderson Coupled Epicyclic Unit, which uses two standard speed unit or a forward and reverse unit.

Option - Torque re-action kit SD-4.18A

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements: SD-1.02 x2

Scale

Three-Speed Epicyclic Gearbox - SD-4.18

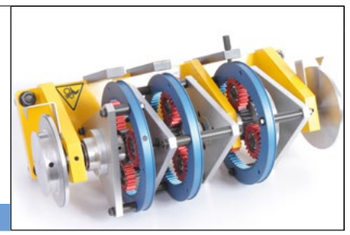
The Epicyclic Gear Units have been developed to enable students to carry out investigations concerning epicyclic gearing in simple and more advanced forms. The Sanderson Three-Speed Epicyclic Gearbox provides two forward speeds and reverse.

Option - Torque re-action kit SD-4.18A

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements: SD-1.02 x2

Scale



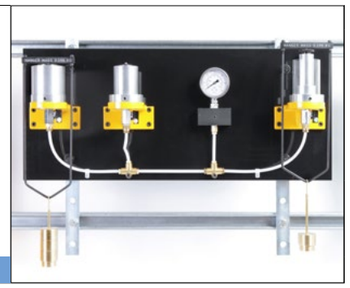
Simple Hydraulic System - SD-1.27

The Hydraulic System is a simple piece of apparatus designed specifically for motor vehicle and mechanical engineering technician courses. It is intended for use in either the classroom or laboratory and may be used for simple demonstrations to illustrate how liquid can be used to transmit a force.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements: SD-1.02 x2

Scale



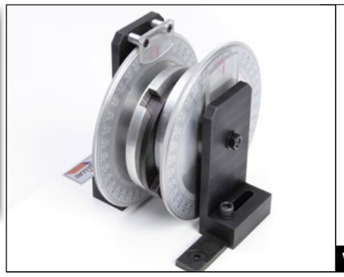
Geneva Stop - DT-9.06

The Geneva mechanism produces intermittent motion from continuous circular motion. It is a positive drive mechanism in which the driven wheel is positively moved or locked.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements

Scale



Oldham Coupling - DT-9.07

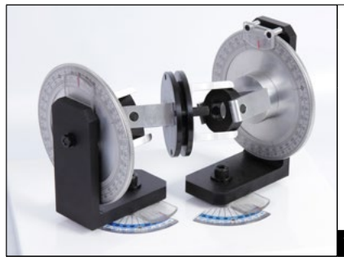
The Oldham coupling is an example of an inversion of the double slider-crank chain.

- This type of coupling is used to connect two parallel shafts

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements

Scale



Hooke's Joint - DT-9.08

A Hooke's joint is a universal joint often used to transmit rotary motion from one shaft to another.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements

Scale

Cam and Follower - DT-9.09

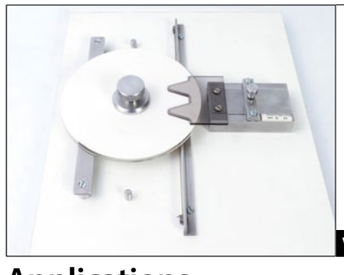
The cam and follower unit enables to study the cam follower and eccentric-follower mechanisms.

- The cam rotates on its axis imparting a reciprocating motion to the follower
- Three elements are determined; Displacement, Velocity and Acceleration of the follower

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements

Scale



Gear Generation Apparatus - DT-9.10

The gear generation apparatus provides a simple mechanical aid for the graphical determination of producing gear tooth profiles.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements

Scale

Applications

ME Mechanical Engineering

IP Industrial Processing

Scale

Cutaway Close-Coupled Centrifugal Pump 2"/DN50 - ME1

The CPU-CC, CPU-MC and CPU-MC series of cutaway centrifugal pumps uses brand new industrial close couple, long coupled and multi-stage centrifugal pumps that are cut away to clearly show the inlet, outlet, impeller, bearings and seals, allowing students to easily visualise pump operation and identify the main pump components.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Scale

Cutaway Long-Coupled Centrifugal Pump 2.5" - ME2

A 2.5" or DN65 inlet cutaway Long Coupled Centrifugal Pump for studying the internal construction and operation of a Long coupled industrial Centrifugal Pump.

Cutaway Multi-Stage Centrifugal Pump 2"/DN50 - ME3

Study the internal construction and operation.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Scale

Cutaway Internal Gear Pump 2"/DN50 - ME4

The CPU-IE and CPU-EG series of cutaway internal and external gear pumps uses brand new industrial gear pumps that are cut away to clearly show the inlet, outlet, gears and seals, allowing students to easily visualise pump operation and identify the main pump components.

Cutaway External Gear Pump 2"/DN50 - ME5

Study the internal construction and operation.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Scale

Cutaway Vane Pump 2"/DN65 - ME6

A 2.5" or DN65 inlet and outlet cutaway Vane Pump for studying the internal construction and operation of an industrial Vane Pump.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Scale

Cutaway Triple Screw Pump - ME7

A 2.5" or DN65 inlet and outlet cutaway Vane Pump for studying the internal construction and operation of an industrial Vane Pump.

Cutaway Triple Lobe Pump - ME8 (2" or DN50)

Cutaway Triple Diaphragm Pump - ME9 (2" or DN40)

Cutaway Triple Diaphragm Pump - ME10 (3/8" or DN10)

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Cutaway Ball Valve 2"/DN50 - ME21
A 2" or DN50 inlet and outlet cutaway ball valve for studying the internal construction and operation of an industrial Ball Valve.

Cutaway Gate Valve 2"/DN50 - ME23
A 2" or DN50 inlet and outlet cutaway Gate Valve for studying the internal construction and operation of an industrial Gate Valve.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements

Scale

NEW

Cutaway Globe Valve 2"/DN50 - ME24
A 2" or DN50 inlet and outlet cutaway Globe Valve for studying the internal construction and operation of an industrial Globe Valve.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements

Scale

Cutaway Butterfly Valve 2"/DN50 - ME27
A cutaway 2"/DN50 inlet and outlet butterfly valve for studying the internal construction and operation of an industrial Butterfly Valve.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements

Scale

NEW

Cutaway Ball Check Valve 2"/DN50 - ME30
A 2" or DN50 inlet and outlet cutaway unsprung Ball Check Valve for studying the internal construction and operation of an industrial Ball Check Valve.

Cutaway Swing Check Valve 2"/DN50 - ME31
A cutaway 2"/DN50 inlet and outlet swing check valve for studying the internal construction and operation of an industrial Swing Check Valve.

Cutaway Disk Check Valve 2"/DN50 - ME32
A 2" or DN50 inlet and outlet cutaway Disc Check Valve for studying the internal construction and operation of an industrial Disc Check Valve.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements

Scale

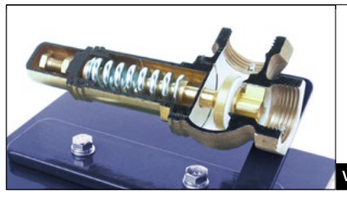
NEW

Cutaway Lift Check Valve 2"/DN50 - ME33
A 2" or DN50 inlet and outlet cutaway Lift Check Valve for studying the internal construction and operation of an industrial Lift Check Valve.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements

Scale



Cutaway Spring Safety Valve 2"/DN50 - ME40
A cutaway 2"/DN50 inlet and outlet spring safety relief valve for studying the internal construction and operation of an industrial Spring Safety Relief Valve.

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

Requirements

Scale

Fixed Tube Sheet Single Pass Heat Exchanger - ME301
A Fixed Tube Sheet, Single Pass Acrylic Heat Exchanger Demonstration Unit for studying the internal construction and assembly of an industrial standard AEL heat exchanger.

U Tube Heat Exchanger - ME302
A U-Tube Heat Exchanger with single pass shell for studying the internal construction and assembly of an industrial standard AEU heat exchanger.

Scale

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

NEW

Vertical Thermosyphon Reboiler - ME303
A Vertical Acrylic Thermosyphon Reboiler Demonstration Unit for studying the internal construction and assembly of a typical industrial Thermosyphon Reboiler.

Scale

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

NEW

Plate Heat Exchanger - ME304
A Plate Heat Exchanger demonstration unit for studying the internal construction and assembly of an industrial standard 13-plate heat exchanger.

Scale

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

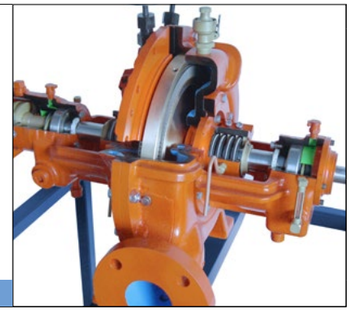
NEW

Cutaway Steam Turbine Without Governor - ME51
A cutaway steam turbine for studying the internal construction and operation of a single stage ball bearing type steam turbine without a governor.

Cutaway Steam Turbine With Governor - ME52
A Cutaway Steam Turbine for studying the internal construction and operation of a single stage ball bearing type steam turbine with a governor.

Scale

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP



Dissectible Pumps & Valves (Full list on our website)
Our dissectible maintenance training kits use new industrial pumps and valves that are commonly used in industrial plants.

Dissectible Single-Stage Centrifugal Pump - ME61
A Brand New Single Stage Centrifugal Pump with DN50 inlet and DN32 outlet for maintenance and repair training.
The set includes a complete toolkit for pump maintenance operations and laminated job worksheets for disassembly, checking, repair and reassembly of a single stage centrifugal pump. All components are supplied in a foam lined rugged industrial case for easy storage and handling.

Scale

View data sheet: www.armfield.co.uk/mechanical_engineering ME IP

NEW

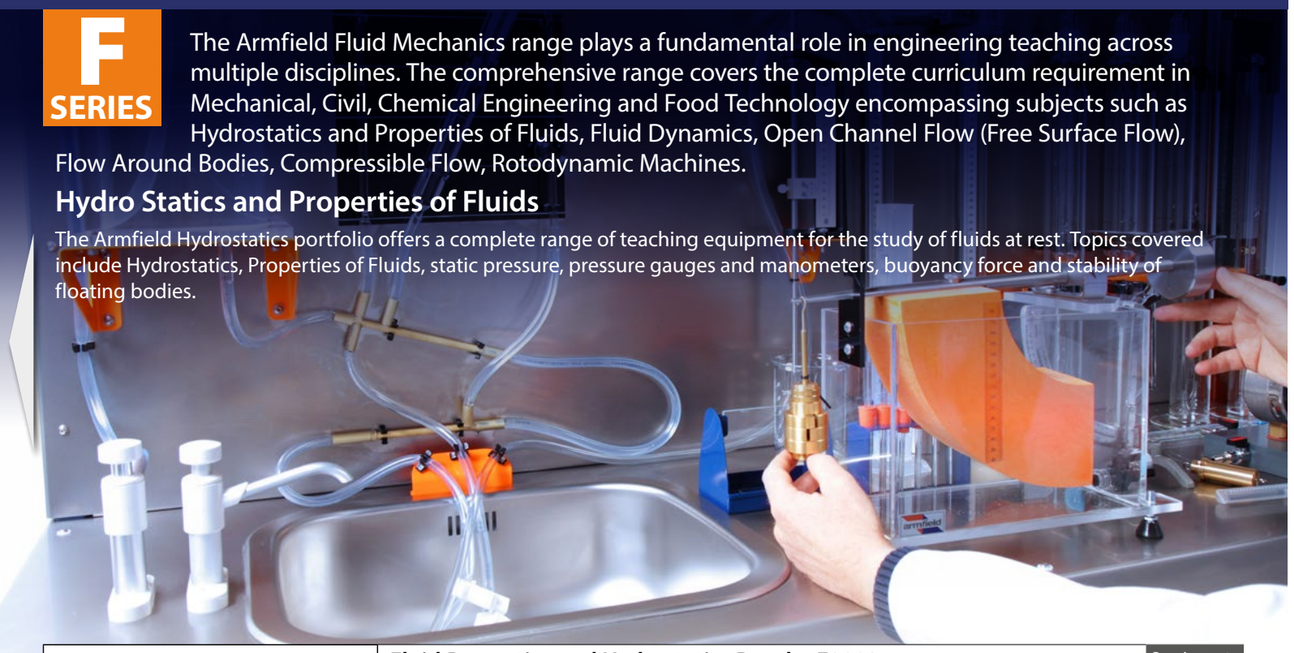
armfield
Fluid Mechanics

F SERIES

The Armfield Fluid Mechanics range plays a fundamental role in engineering teaching across multiple disciplines. The comprehensive range covers the complete curriculum requirement in Mechanical, Civil, Chemical Engineering and Food Technology encompassing subjects such as Hydrostatics and Properties of Fluids, Fluid Dynamics, Open Channel Flow (Free Surface Flow), Flow Around Bodies, Compressible Flow, Rotodynamic Machines.

Hydro Statics and Properties of Fluids

The Armfield Hydrostatics portfolio offers a complete range of teaching equipment for the study of fluids at rest. Topics covered include Hydrostatics, Properties of Fluids, static pressure, pressure gauges and manometers, buoyancy force and stability of floating bodies.



Fluid Properties and Hydrostatics Bench - F9092

A practical instruction unit designed to demonstrate the properties of fluids and their behaviour under hydrostatic conditions.

A variety of measuring devices enables 16 experiments to be carried out to develop an understanding of a wide range of fundamental principles.

Shown with options.

Requirements: COLD

View data sheet: www.armfield.co.uk/f9092 — ChE ME CE IP

Scale

Dead Weight Pressure Gauge Calibrator - F1-11

The dead weight pressure gauge calibrator consists of a precision-machined piston and cylinder assembly mounted on levelling screws. The unit is supplied with a Bourdon gauge for calibration. The weights supplied are added to the upper end of the piston rod, which is rotated to minimise friction effects. The gauge is thus subject to known pressures, which may be compared with the gauge readings and an error curve drawn.

Requirements

View data sheet: www.armfield.co.uk/f1 — ChE ME CE IP

Scale

Precision Pressure Gauge Calibrator - F4

The equipment is self-contained and portable, so it may be used in lecture theatre demonstrations or as a master calibrator for the laboratory. The pressure in the system is produced by means of a capstan-operated hydraulic ram, balanced by a deadweight acting upon a piston of known area. Oil is used as the hydraulic fluid. Meeting commercial standards, this laboratory dead weight calibrator is for gauges in the range 0.1-300bar. Accuracy is 0.03% of reading, traceable to International Pressure Standards.

Requirements

View data sheet: www.armfield.co.uk/f4 — ChE ME CE IP

Scale

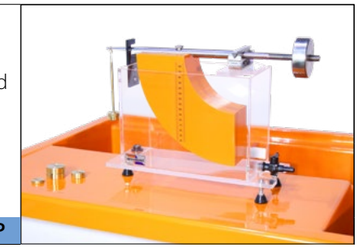
Hydrostatic Pressure - F1-12

The Hydrostatic Pressure accessory has been designed to determine the static thrust exerted by a fluid on a submerged surface, it also enables comparison of the measured magnitude and position of this force with simple theory.

Requirements: COLD

View data sheet: www.armfield.co.uk/f1 — ChE ME CE IP

Scale



Metacentric Height - F1-14

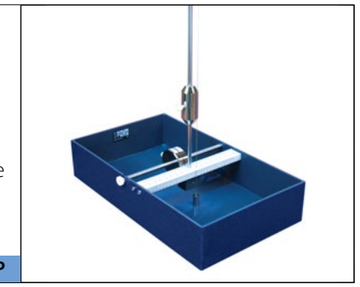
This unit allows the position of the metacentric height to be varied to produce stable and unstable equilibrium.

The equipment consists of a plastic rectangular floating pontoon, whose centre of gravity can be varied by way of an adjustable weight, which slides and can be clamped in any position on a vertical mast. A single plumb-bob is suspended from the mast, which indicates the angle of heel on a calibrated scale.

Requirements: COLD

View data sheet: www.armfield.co.uk/f1 — ChE ME CE IP

Scale



Fluid Statics and Manometry - F1-29

The right-hand manometer tube is separate from the other tubes and incorporates a pivot and indexing mechanism at the base that enables this tube to be inclined at fixed angles of 5°, 30°, 60° and 90° (vertical).

The reservoir incorporates a hook and point gauge with Vernier scale, mounted through the lid, that enables large changes in level to be measured with precision. A vertical transparent piezometer tube through the lid of the reservoir enables the static head above the water in the reservoir to be observed when the air space above the water is not open to atmosphere.

Requirements: COLD

View data sheet: www.armfield.co.uk/f1 — ChE ME CE IP

Scale

Fluid properties apparatus - F1-30

This apparatus provides an introduction to the fundamental properties of liquids that affect their behaviour in practical applications.

This unit includes:

- Universal hydrometer -two calibrated falling-sphere viscometer tube - 3 steel spheres - thermometer - aneroid barometer - 6 varying diameter capillary tubes - pycnometer and a dual scale level balance

Requirements: COLD

View data sheet: www.armfield.co.uk/f1 — ChE ME CE IP

Scale

Pascal's apparatus - F1-31

The Pascal's apparatus provides a simple demonstration that the pressure in an incompressible fluid varies with depth and does not depend on the shape of the container.

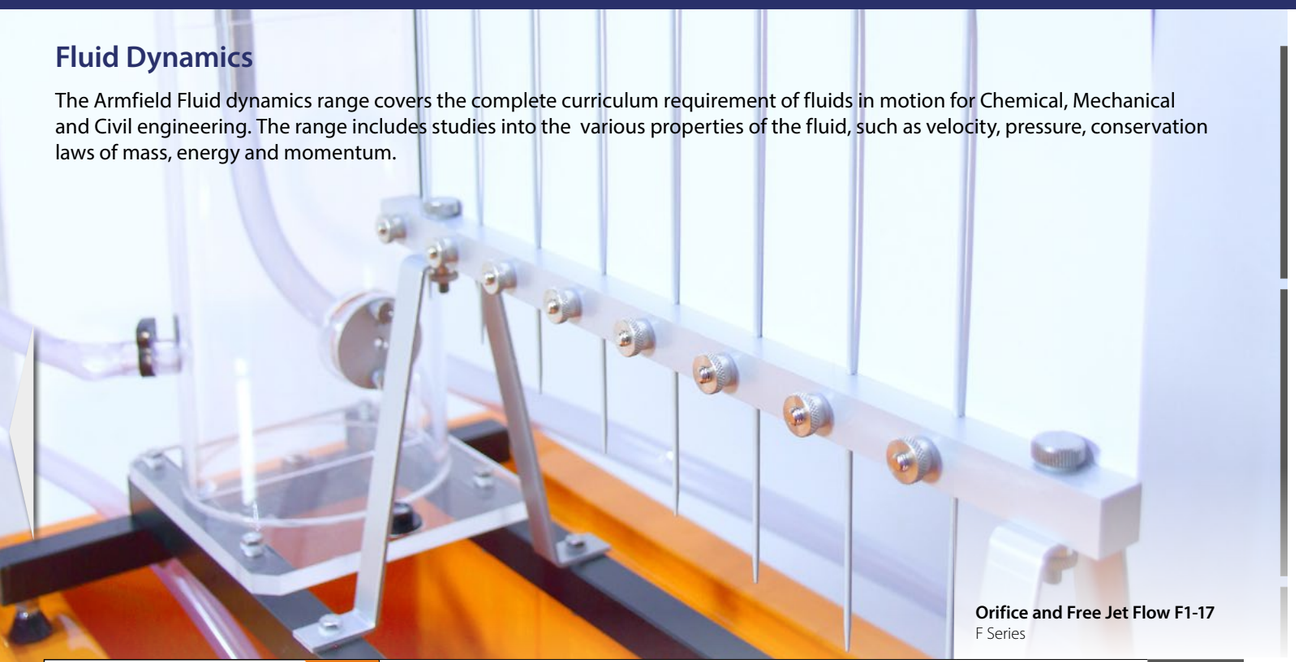
Requirements: COLD

View data sheet: www.armfield.co.uk/f1 — ChE ME CE IP

Scale

Fluid Dynamics

The Armfield Fluid dynamics range covers the complete curriculum requirement of fluids in motion for Chemical, Mechanical and Civil engineering. The range includes studies into the various properties of the fluid, such as velocity, pressure, conservation laws of mass, energy and momentum.



Orifice and Free Jet Flow F1-17
F Series

Digital flow meter

NEW

Basic Hydraulics Bench - F1-10 (Factory fit, digital flow meter option shown)

The hydraulics bench is constructed from lightweight corrosion-resistant plastic and is mounted on wheels for mobility. The benchtop incorporates the following:

Fluid Mechanics Software (Option) F1-aBASIC

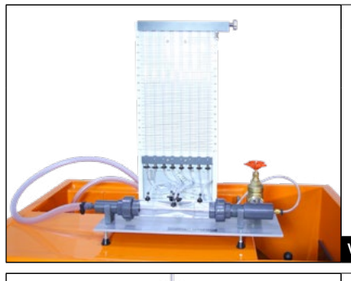
- Open channel with side channels are supplied as standard to support the accessory on test
- Submersed centrifugal pump
- Sump tank
- Quick-release pipe connector for rapid exchange of accessories, no need for hand tools
- The volumetric measuring tank is stepped to accommodate low or high flow rates
- Digital flow meter option available

Requirements: 1Ph, USB, COLD, PC

View data sheet: www.armfield.co.uk/f1

ChE ME CE IP

Scale



Bernoulli's Theorem Demonstration - F1-15

This accessory illustrates those circumstances to which Bernoulli's Theorem may be applied. Also, separately, why in other circumstances the theorem gives an inadequate description of the fluid behaviour.

Requirements: F1-10

View data sheet: www.armfield.co.uk/f1

ChE ME CE IP

Scale

Impact of a Jet - F1-16

Water is discharged vertically through a nozzle to strike a target carried on a stem, which extends through the cover. The dead weight of the moving parts are counterbalanced by a compression spring.

The vertical force exerted on the target plate is measured by adding the weights supplied to the weight pan.

Requirements: F1-10

View data sheet: www.armfield.co.uk/f1

ChE ME CE IP

Scale

Orifice and Free Jet Flow F1-17

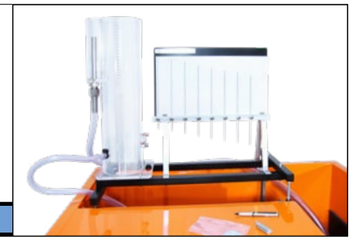
Requirements: F1-10

A constant head tank is maintained with water from the Hydraulics Bench. The orifice (3mm or 6mm) is installed at the base of this tank ensuring a flush inside surface. The jet trajectory is mapped using 8-point gauges to determine the discharge coefficient.

View data sheet: www.armfield.co.uk/f1

ChE ME CE IP

Scale



Orifice Discharge - F1-17a

Requirements: F1-10

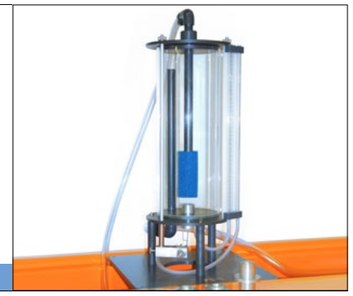
The Orifice Discharge accessory enables full analysis of the flow through different orifices over a range of flow rates. It consists of:

- Seven orifice plates
- A cylindrical clear acrylic tank, with an orifice fitted in the base
- A carrier enables a pitot tube to be accurately positioned anywhere in the jet
- A wire micrometre is used to accurately measure the jet diameter and the vena contracta diameter and so determine the contraction coefficient

View data sheet: www.armfield.co.uk/f1

ChE ME CE IP

Scale



Energy Losses in Pipes - F1-18

Requirements: F1-10

The unit consists of a vertical test pipe on the side of the equipment, which can be fed directly from the Hydraulics Bench supply or, alternatively, from the integral constant head tank above.

These in turn provide high or low flow rates which may be controlled by a valve at the discharge end of the test pipe. Manometers are used to measure the head loss. For large pressure differentials we would recommend the Armfield H12-8 Digital Pressure meter. In addition, a pressurised water manometer for small pressure differentials is also fitted to the unit.

View data sheet: www.armfield.co.uk/f1

ChE ME CE IP

Scale

Osborne Reynolds' Demonstration - F1-20

Requirements: F1-10

A header tank containing stilling media provides a constant head of water through a bellmouth entry to the flow visualisation pipe. Flow through this pipe is regulated using a control valve at the discharge end. The flow rate can be measured using the volumetric tank (or measuring cylinder) of the Hydraulics Bench. Velocity of the water can therefore be determined to enable calculation of Reynolds' number.

View data sheet: www.armfield.co.uk/f1

ChE ME CE IP

Scale

Osborne Reynolds' Apparatus - F5

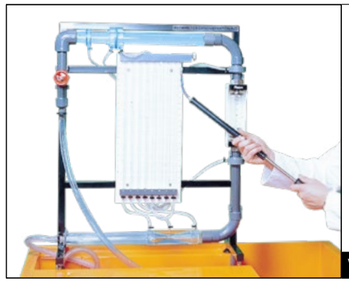
Requirements: COLD

This equipment enables a full study of the classic experiments conducted by Professor Osborne Reynolds into laminar and turbulent flow. With careful attention to the entry conditions, the student is assured of repeatable results.

View data sheet: www.armfield.co.uk/f5

ChE ME CE IP

Scale



Flow Meter Demonstration - F1-21

This accessory is designed to introduce students to three basic types of flow meter:

- Venturi meter
- Variable-area flowmeter (Rotameter)
- Orifice plate
- 8 pressure tappings are connected and displayed on the manometer bank to visualise pressure profiles.

View data sheet: www.armfield.co.uk/f1 ChE ME CE IP

Requirements: F1-10

Scale

Energy Losses in Bends and Fittings - F1-22

This accessory permits losses in different bends, a sudden contraction, sudden enlargement and a typical control valve, to be demonstrated.

- Mitre bend - 90° elbow - Swept bends (large and small radius)
- Sudden contraction and sudden enlargement
- Fully Instrumented with upstream and downstream pressure tappings.
- A bank of 12 water manometer tubes, mounted on the framework for visualisation of the pressure drop profiles.

View data sheet: www.armfield.co.uk/f1 ChE ME CE IP

Requirements: F1-10

Scale

Free and Forced Vortex - F1-23

This equipment is designed to produce and measure the characteristics of free and forced vortices.

View data sheet: www.armfield.co.uk/f1 ChE ME CE IP

Requirements: F1-10

Scale

Hydraulic Ram - F1-24

If flowing water is suddenly brought to rest in a long pipe, a phenomenon known as water hammer occurs, which produces a pressure wave that travels along the pipe. This principle is used in the hydraulic ram to pump water.

View data sheet: www.armfield.co.uk/f1 ChE ME CE IP

Requirements: F1-10

Scale

Cavitation Demonstration - F1-28

This equipment demonstrates to students visually, audibly and numerically the phenomenon of cavitation and its association with the vapour pressure of a liquid.

View data sheet: www.armfield.co.uk/f1 ChE ME CE IP

Requirements: F1-10

Scale

ChE Chemical Engineering
ME Mechanical Engineering
CE Civil Engineering
IP Industrial Processing

Requirements: F1-10

Scale

Pitot Tube Demonstrator - F1-33

The Armfield F1-33 is designed to demonstrate the operation and characteristics of a Pitot-static tube that is used to determine fluid velocity by measuring the difference between the Total head and the Static head of water flowing inside a pipe using a manometer.

View data sheet: www.armfield.co.uk/f1 ChE ME CE IP

Requirements: F1-10

Scale

Pipe networks accessory - C11-MkII

Specifically designed to allow the study of a wide range of different pipe networks. The unit consists of:

- Pipe network mounted on free standing support frame
- Clear acrylic test pipes all 0.70m long
- Inside diameters of 1x 6mm, 2x 9mm, 1x 10mm, 1x 14mm
- 10 Isolating Valves
- Hand-held electronic pressure meter with self-sealing quick-release connections

View data sheet: www.armfield.co.uk/c11mkii ChE ME CE IP

Requirements: F1-10, PC, USB

Scale

Fluid Friction Measurements - C6-MkII

The head loss caused by fluid friction in straight pipes and the effects of fluid velocity, pipe diameter and surface roughness can be fully investigated using this apparatus.

The complete system enables the investigation of the phenomenon associated with incompressible fluid flow in pipes.

- ArmSoft educational software for fluid friction measurements is available
- Data logging accessory available

View data sheet: www.armfield.co.uk/c6mkii ChE ME CE IP

Requirements: F1-10, PC, USB

Scale

Pipe Surge & Water Hammer Apparatus - C7-MkII

Specifically designed to produce and measure the shock waves associated with the phenomenon of water hammer. Correlation between actual and theoretical shock waves can be examined as well as the determination of the sonic velocity within the pipe. The characteristics of a surge shaft can also be examined.

View data sheet: www.armfield.co.uk/c7mkii ChE ME CE IP

Requirements: 1Ph, USB, COLD, PC

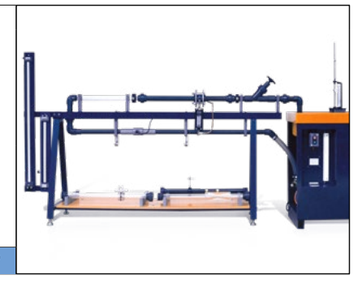
Scale

Comprehensive Flow Meter Demonstration - C9

A self-contained apparatus to demonstrate the characteristics of flow meters used in measurement of water flow through pipes or open channels. Configurable with 14 Accessories:

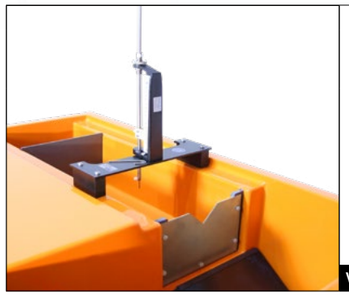
Current meter - Inferential multi-stream - Washington flume - Helical rotary - Shunt gapmeter - 'H' flume – Electromagnetic – Pitot - Crump weir - Volumetric rotary piston – Orifice - Broad-crested weir - Swinging flap - Venturi

View data sheet: www.armfield.co.uk/c9 ChE ME CE IP



Open Channel Flow (Free Surface Flow)

Armfield supplies a range of Open-channel flow products, ranging from an introduction to the characteristics of flow in an open channel, free surface flow and closed conduit flow.



Flow over weirs - F1-13

The Flow Over Weirs accessory consists of five basic elements, used in conjunction with the flow channel, in the moulded bench top of the Hydraulics Bench. Two weir plates of different shapes are provided enabling familiarisation and comparison with theory.

- Demonstrating the characteristics of flow over a rectangular notch
- Demonstrating the characteristics of flow over a vee notch
- Determining the coefficient of discharge

Requirements: F1-10

View data sheet: www.armfield.co.uk/f1 — ChE ME CE IP — Scale

Flow Channel - F1-19

The Flow Channel introduces students to the characteristics of flow in an open channel at an elementary level.

- Demonstrating basic phenomena associated with open channel flow
- Visualisation of flow patterns over or around an immersed object

Requirements: F1-10

View data sheet: www.armfield.co.uk/f1 — ChE ME CE IP — Scale

Hydraulic Flow Demonstrator - S16

The S16 operates as an accessory to the F1-10 Hydraulics Bench, offering a highly visual demonstration of flow through both open channels and closed conduits. Includes a unique elevating bed section, and models of various hydraulic structures.

Hydraulic Flow Demonstrator With Direct Reading Flowmeter **- S16-11**

Covers both fluid dynamics and open channel flow topics.

- Demonstrate flow through both open channels and closed conduits
- Unique elevating bed section
- Models of various hydraulic structures demonstrating critical flow and energy changes
- Clear acrylic sides for good visibility of flow patterns created

Requirements: F1-10

View data sheet: www.armfield.co.uk/s16 — ChE ME CE IP — Scale

Multi-Purpose Teaching Flume - C4-MkII
Crump Weir

Requirements: F1-10, PC, USB

Multi-Purpose Teaching Flume - C4-MkII

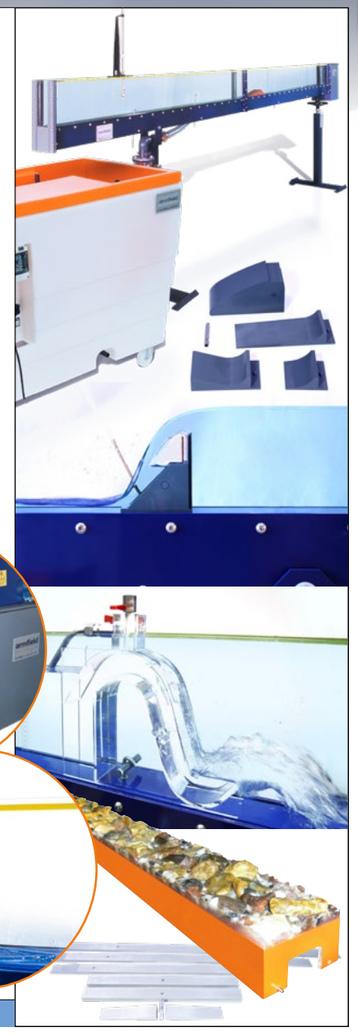
A low cost laboratory flume with an experimental range and accuracy comparable with larger-scale research flumes. Students can clearly see the models under investigation through the transparent side walls. A wide selection of open channel experiments can be performed.

A set of models and gauges are provided with the flume as part of the standard supply, comprising:

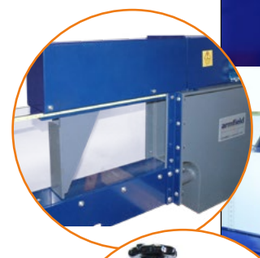
- Venturi flume
  Sharp and broad crested weirs
  Crump weir
  Adjustable undershot weir
  Two Vernier level gauges

Available in 2.5m and 5.0m working section lengths.
Optional educational software is available (C4-MkII-ABASIC) offering a complete teaching package of coursework.

Multi-Purpose Teaching Flume With Flow Meter **- C4-MkII-11**
aBASIC Teaching Software For Multi-Purpose Flume **- C4-MkII**



Additional C4-MKII accessories:



C4-61 Pitot Tube and Manometer Board

C4-62 Culvert Fitting

C4-63 Flow Splitters

C4-64 Spillway and Toe Blocks

C4-65 Siphons (2 types)

C4-66 Radial Gate Model

C4-67 Wave Generator and Beach

C4-68 False Floor Sections

C4-69 Roughened Bed Plates, 2.5m long

Scale

View data sheet: www.armfield.co.uk/c4mkii — ChE ME CE IP

Flow Around Bodies

The Armfield Flow Around Bodies range provides students with an understanding of flow around any shape of a body. This subject matter is relevant to both fluid dynamics and aerodynamics studies.

Subsonic Wind Tunnel - C2
Measuring lift and drag forces

Particle Drag Coefficients - F12

A wall mounted apparatus in which particles of various size and density can be used to introduce the fundamental characteristics of the behaviour of particle/fluid systems. In particular, the relationship between the drag coefficients of falling particles and their Reynolds' number value.

- Compact, wall mounted apparatus to study the behaviour of particles and shapes within fluids
- 2 x Ceramic Spheres (One off each: 6.35mm and 9.5mm Diameter)
- 4 x Stainless Steel Spheres (One off each: 3.17mm, 6.35mm, 7.9mm and 9.5mm Diameter)

View data sheet: www.armfield.co.uk/f12 ChE ME CE IP

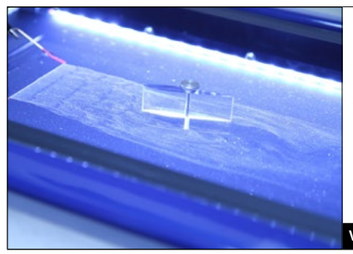
Requirements: 1Ph
Scale

Laminar Flow Table - C10

Enables comprehensive grid measurement and photography of two dimensional laminar flow patterns in incompressible fluids. The equipment extends the classical Hele-Shaw approach by including eight sinks and sources, plus a dye injection system, enabling flow patterns to be seen more vividly.

View data sheet: www.armfield.co.uk/c10 ChE ME CE IP

Requirements: COLD
Scale



Hydrogen Bubble Flow Visualisation System - C16

An elegant method of flow visualisation, where hydrogen bubbles are used to visualise fluid mechanics phenomena so difficult to describe theoretically.

The system utilises a unique fluid drive unit to provide smooth flow in the working channel. An optional high resolution firewire webcam can be used to link to projectors or displays for large-scale presentations.

View data sheet: www.armfield.co.uk/f14 ChE ME CE IP

Requirements: 1Ph
Scale

Subsonic Wind Tunnel - C2

This wind tunnel has been designed to provide the fundamental air flow facilities necessary to perform basic wind tunnel experiments. Its mobility makes it uniquely suitable for both laboratory or lecture room and the performance of the tunnel and its instrumentation make it suitable for simple project work.

Data logging accessory H14/2 available.

View data sheet: www.armfield.co.uk/c2 ChE ME CE IP

Requirements: 1Ph
Scale

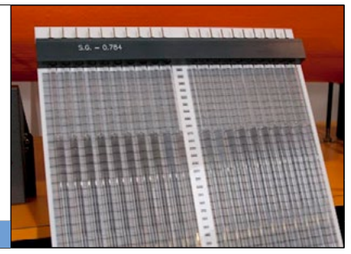
Multi Tube Manometer - C2-13

This is an inclinable manometer board equipped with 20 tubes, acrylic manifold and a reservoir mounted on a vertical rod such that the position of the datum manometer tube levels may be adjusted to convenient heights before commencing experiments.

Scale length is 370mm accommodating measurement of pressure up to 290mm water gauge.

View data sheet: www.armfield.co.uk/c2 ChE ME CE IP

Requirements: C2
Scale



Pressure Wing and Rake - C2-14

The wing profile is based on the NACA 0015 aerofoil section with chord length of 100mm. Eleven pressure tappings, all perfectly flush with the wing surface are distributed around the profile and fitted with flexible tube designed to be connected to the Multi Tube Manometer C2-13. All the tubes are housed inside the wing to avoid interference with the air flow.

View data sheet: www.armfield.co.uk/c2 ChE ME CE IP

Requirements: C2
Scale

Slot and Flap Aerofoil - C2-15

The aerofoil, accurately machined to NACA 0015 profile, is equipped with an adjustable leading edge slot and trailing edge flap. It has a 63mm chord and a 250mm span. The flap is adjustable in angular deflection and in clearance from the aerofoil.

View data sheet: www.armfield.co.uk/c2 ChE ME CE IP

Requirements: C2
Scale

Pitot Static Tube- C2-16

This item is of 4mm diameter stainless steel tube with a collet-type mounting chuck to facilitate full traverse across the working section.

View data sheet: www.armfield.co.uk/c2 ChE ME CE IP

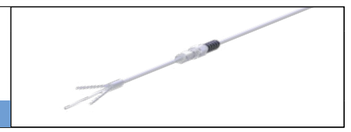
Requirements: C2
Scale

Yaw Probe- C2-17

This item is of 4mm diameter stainless steel tube with a collet-type mounting chuck to facilitate full traverse across the working section.

View data sheet: www.armfield.co.uk/c2 ChE ME CE IP

Requirements: C2
Scale



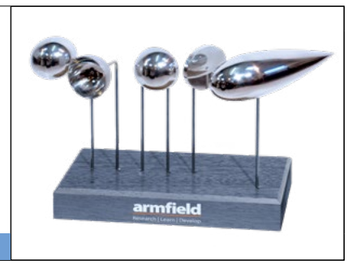
Drag Models- C2-18

Five models, designed to be mounted in the lift and drag balance and all of the same equatorial diameter, are provided:

- Sphere
- Hemisphere, convex to airflow direction
- Hemisphere, concave to airflow direction
- Circular disk
- Streamlined shape

View data sheet: www.armfield.co.uk/c2 ChE ME CE IP

Requirements: C2
Scale

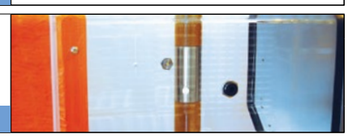


Pressure Cylinder- C2-19
A 50mm polished cylinder with 19 tapping points.

Flutter Wing- C2-20
Two-dimensional symmetrical aerofoil to NACA 0015 specification.

View data sheet: www.armfield.co.uk/c2 ChE ME CE IP

Requirements: C2
Scale



Computer Controlled Subsonic Wind Tunnel - C15

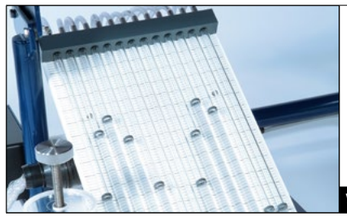
The Armfield C15 is a computer controlled subsonic bench-top wind tunnel designed for undergraduate teaching. It has a 150mm (six inch) transparent working section and offers a wide range of models for aerodynamic and air flow studies.

An extensive range of models, accessories & instrumentation is available for the C15-10

Requirements: 1Ph, PC, USB

View data sheet: www.armfield.co.uk/c15 ChE ME CE IP

Scale



Inclined Manometer Bank - C15-11

A bank of 13 transparent tubes inclined at 30° to measure small pressure differences (0–160 mm H_2O). It includes a water reservoir with screw operated displacer to allow rapid adjustment of the datum level in the manometer, and is fitted with quick release connectors for rapid connection to models and instruments.

Requirements: C15

View data sheet: www.armfield.co.uk/c15 ChE ME CE IP

Scale

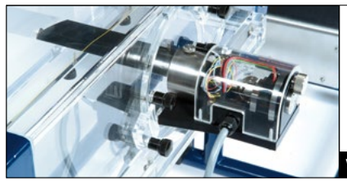
Electronic Manometer Bank - C15-12

An electronic console incorporating 16 differential pressure sensors, each with a range of 0-178 mm H_2O. (It connects to the control PC using a second USB port, and the readings are fully integrated with the wind tunnel control software.)

Requirements: C15

View data sheet: www.armfield.co.uk/c15 ChE ME CE IP

Scale



Lift and Drag Balance - C15-13 (requires C15-20 or C15-22)

A 2-component, electronic balance used to measure the lift and drag on appropriate models (not used with models having multiple internal tapping points). The lift and drag models connect to the balance using a simple fixing that ensures correct orientation of the model.

Requirements: C15

View data sheet: www.armfield.co.uk/c15 ChE ME CE IP

Scale

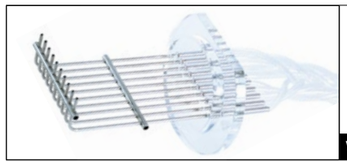
Pitot Static Tube - C15-14 (requires C15-11 or C15-12)

A small Pitot static tube mounted in a bush that can be located in the roof of the working section at three alternative positions, i.e. the start of the working section and upstream and downstream of the model mounting position

Requirements: C15

View data sheet: www.armfield.co.uk/c15 ChE ME CE IP

Scale



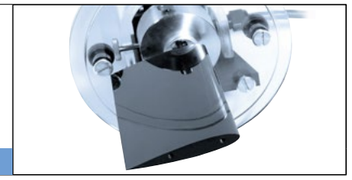
Wake Survey Rake - C15-15 (requires C15-11 or C15-12)

The rake consists of 10 tubes positioned vertically in a row and pointing towards the airflow. The rake is mounted downstream of the model being used.

Requirements: C15

View data sheet: www.armfield.co.uk/c15 ChE ME CE IP

Scale



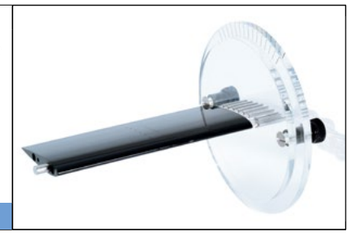
Lift & Drag Aerofoil - C15-20 (requires C15-13)

A plain symmetrical aerofoil to NACA 0015 profile, incorporating a mounting rod that allows it to be installed on the C15-13 Lift & Drag Balance, thus allowing the lift and drag to be measured with the aerofoil at different angles of attack.

Requirements: C15

View data sheet: www.armfield.co.uk/c15 ChE ME CE IP

Scale



Pressure Wing- C15-21 (requires C15-11 or C15-12)

A symmetrical aerofoil incorporating 10 tapping points distributed along the wing profile on one side, which allows the pressure distribution to be measured from the leading edge to the trailing edge. The pressure distribution on the upper and lower surface can be obtained by inclining the aerofoil at positive and negative angles of attack. Machined to NACA 0015 profile, the aerofoil has the same section as the C15-20 to allow direct comparison of pressure distribution with the lift characteristics

Requirements: C15

View data sheet: www.armfield.co.uk/c15 ChE ME CE IP

Scale

Drag Models - C15-22 (requires C15-13)

Seven different models are provided for use with the C15-13 Lift and Drag Balance for investigations into the influence of shape on the drag forces. Five models are supplied with a common equatorial diameter of 50mm, thus all presenting the same cross section to the airflow: Sphere - Hemisphere, convex to airflow - Hemisphere, concave to airflow - Circular disk - Streamlined shape. Additionally a dimpled golf ball and plain sphere demonstrate the difference in drag force due to the dimples.

Requirements: C15

View data sheet: www.armfield.co.uk/c15 ChE ME CE IP

Scale

Pressure Cylinder - C15-23 (requires C15-11 or C15-12)

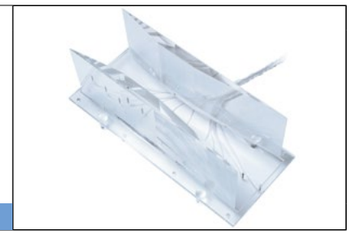
A plain cylinder, 30mm diameter, incorporating 10 equi-spaced tapping points around half of the circumference that allow the pressure distribution around the cylinder to be measured.

The cylinder can be rotated through 180° to plot the pressure distribution over the whole circumference.

Requirements: C15

View data sheet: www.armfield.co.uk/c15 ChE ME CE IP

Scale



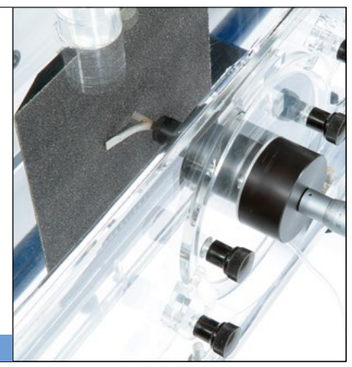
Bernoulli Apparatus - C15-24 (requires C15-11 or C15-12)

A Venturi profile that is installed in the working section of the tunnel via the removable floor. The Venturi incorporates 11 pressure tappings in the floor, connected via flexible tubing to quick release connectors. The Venturi occupies the full height of the working section and the width varies from 150mm (full width of the working section) at the inlet and outlet to 100mm at the throat. It is manufactured from clear acrylic for full visualisation.

Requirements: C15

View data sheet: www.armfield.co.uk/c15 ChE ME CE IP

Scale



Boundary Layer Plate - C15-25 (requires C15-11 or C15-12)

A flat plate, with a bevelled leading edge, that is mounted vertically in the working section via the removable floor. A flattened Pitot tube, mounted on a traversing micrometer, allows the air velocity to be measured at different distances from the surface of the plate.

A smooth plate and artificially roughened plate (above) are included to show the difference between laminar and turbulent boundary layers. The flexible tubing from the Pitot tube incorporates a quick release connector.

Project Kit - C15-26

A selection of components that allow alternative models to be constructed by the user. Includes a floor panel, a circular hatch and a set of connectors with appropriate flexible tubing.

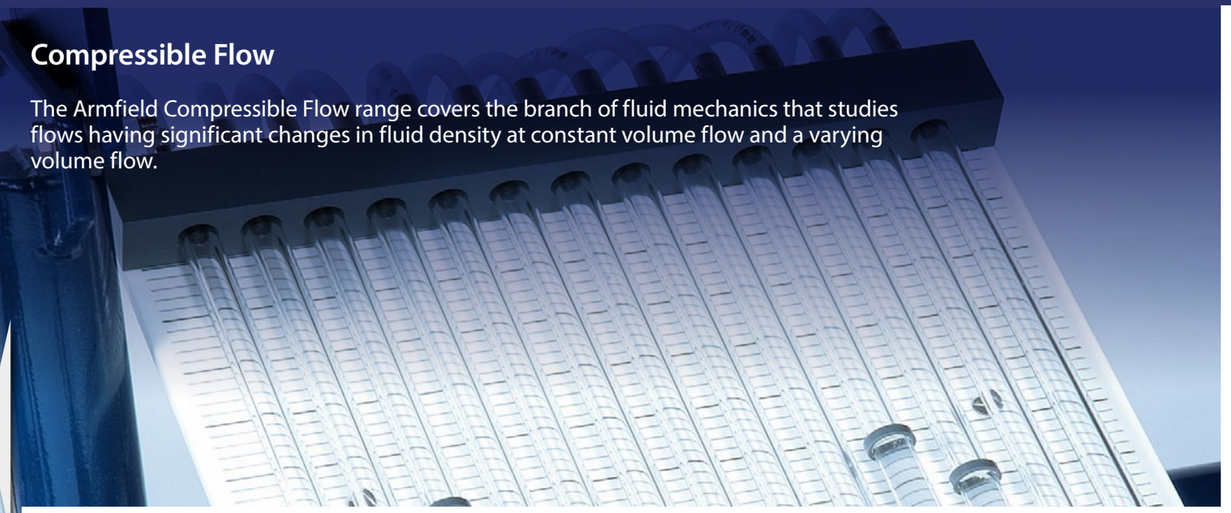
Requirements: C15

View data sheet: www.armfield.co.uk/c15 ChE ME CE IP

Scale

Compressible Flow

The Armfield Compressible Flow range covers the branch of fluid mechanics that studies flows having significant changes in fluid density at constant volume flow and a varying volume flow.



Air Flow Studies - F6

This self-contained unit, providing a long, smooth-walled pipe connected to the suction inlet of a centrifugal fan, is used to demonstrate how to measure important characteristics of industrial air distribution systems.

It can also show how certain basic principles of fluid mechanics may be applied to analyse flow in ducts and jets.

Data logging accessory H14/2 available.

Requirements: 1Ph

View data sheet: www.armfield.co.uk/f6 — ChE ME CE IP

Scale

Compressible Flow Unit - C1-MkIII

A versatile apparatus, based around a multi-stage air compressor, designed to teach the concepts of compressible flow. The basic unit contains all that is required to demonstrate the fundamental principles, but an accessory is also available, containing a number of interchangeable test sections to give a wider knowledge and understanding to the student.

Compressible Flow Unit - C1-MkIII-30 Additional test sections option

Compressor Test Accessory - C1-MkIII-35 Compressor performance tests

C1-MkIII-DTA-aLITE Data logger and Educational software option

Requirements: 1Ph, PC, USB

View data sheet: www.armfield.co.uk/c1mkiii — ChE ME CE IP

Scale

Customer training

Depending on your requirements, we can train individuals or groups, either on site or at our training facility.

Contact us at ict@armfieldassist.com

Rotodynamic Machines

The Rotodynamic Machines range from Armfield introduces students to kinetic machines in which energy is continuously imparted to the pumped fluid by means of a rotating impeller, propeller, or rotor. The range also offers a comparison with positive displacement pumps.

Demonstration Pelton Turbine - F1-25

The Demonstration Pelton Turbine provides a simple low cost introduction to turbine performance.

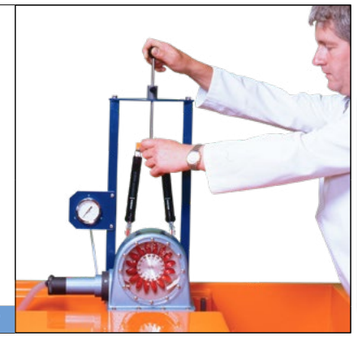
The unit consists of;

- Turbine wheel inside cast housing with acrylic panel to enable viewing
- Mechanical torque measured using dynamometer with spring balances
- Inlet pressure gauge
- Quick-release fitting for easy connection to Hydraulics Bench

Requirements: F1-10

View data sheet: www.armfield.co.uk/f1 — ChE ME CE IP

Scale



Series/Parallel Pumps - F1-26

The introduction of a second pump to the Hydraulic Bench system enables the study of two pump performance, both in series and parallel operation.

Requirements: 1Ph, F1-10

View data sheet: www.armfield.co.uk/f1 — ChE ME CE IP

Scale

Centrifugal Pump Characteristics - F1-27

This accessory offers similar features to those described for the F1-26, but with enhanced capabilities provided by an inverter driven variable speed pump rather than a fixed speed pump.

Requirements: 1Ph, F1-10

View data sheet: www.armfield.co.uk/f1 — ChE ME CE IP

Scale

Demonstration Francis turbine - F1-32

This demonstration turbine provides an introduction to the Francis inward flow reaction turbine.

The Unit consists of;

- Francis runner surrounded by six guide vanes inside a volute with clear acrylic front panel for visualisation
- Guide vanes adjustable when turbine is running with scale to indicate degree of opening
- Francis runner 60mm diameter with 12 blades
- Brake force determined using Prony-type brake dynamometer
- Inlet pressure gauge with range 0-2 bar

Requirements: F1-10

View data sheet: www.armfield.co.uk/f1 — ChE ME CE IP

Scale

C3-MkII-20SP
Second Centrifugal Pump

Multi-Pump Test Rig - C3-MkII

The rig can accommodate both rotodynamic and positive displacement pumps, and is supplied with the most common example of each type as standard (i.e. a centrifugal pump and a gear pump). A range of other pump types are available as accessories, including axial, turbine, flexible impeller, diaphragm and plunger; plus a second centrifugal pump for series/parallel demonstrations.

Up to four pumps can be accommodated within the rig simultaneously for use within a single laboratory period, and each can be run without disconnecting any pipework or connections.

ArmSoft Educational software and data logging hardware included as standard.

C3-MkII-20SP	Second Centrifugal Pump
C3-MkII-22	Axial Flow Pump
C3-MkII-23	Flexible Impellor Pump
C3-MkII-24	Turbine Pump
C3-MkII-25	Diaphragm Pump (requires C3-MkII-40)
C3-MkII-26	Plunger Pump (requires C3-MkII-40)
C3-MkII-40	Volumetric Measurement System

Requirements: 1Ph, PC, USB

View data sheet: www.armfield.co.uk/c3mkii

ChE ME CE IP

Scale

Naval Architecture

The Armfield Naval Architecture range provides in-depth studies into fluid mechanics relating to Ship Science. Subjects covered include ship resonant vibration, distribution of mass and second moment of area, ship hydrostatics and ship stability.

Ships Vibration Apparatus - NA4

The apparatus is designed to enable an investigation of a simple model hull form enabling many of the principal phenomena connected with ship resonant vibration to be clearly demonstrated. At a more advanced level, the distribution of mass and second moment of area may be calculated and natural frequencies estimated/ compared with measured values.

Flotation Tank - NA4 (Optional)

Requirements: 1Ph, NA 4-11

View data sheet: www.armfield.co.uk/na48

ChE ME CE IP

Scale

Ships Stability Apparatus - NA8

Developed for the laboratory study of ship hydrostatics and stability. The complete apparatus comprises four different types of vessel models with ballast weights, clinometer and a water tank in which to float them. Righting moment is measured by a free-standing dynamometer.

NA4-10 Ships Vibrations Test Model

NA4-11 Flotation Tank for NA4-10

NA8-10 Large Angle Stability System (c/w Accessories)

NA8-14 Trawler Model

NA8-15 Crane Ship Model

NA8-16 Rectangular Barge Model

Requirements: 1Ph, NA 4-11

View data sheet: www.armfield.co.uk/na48

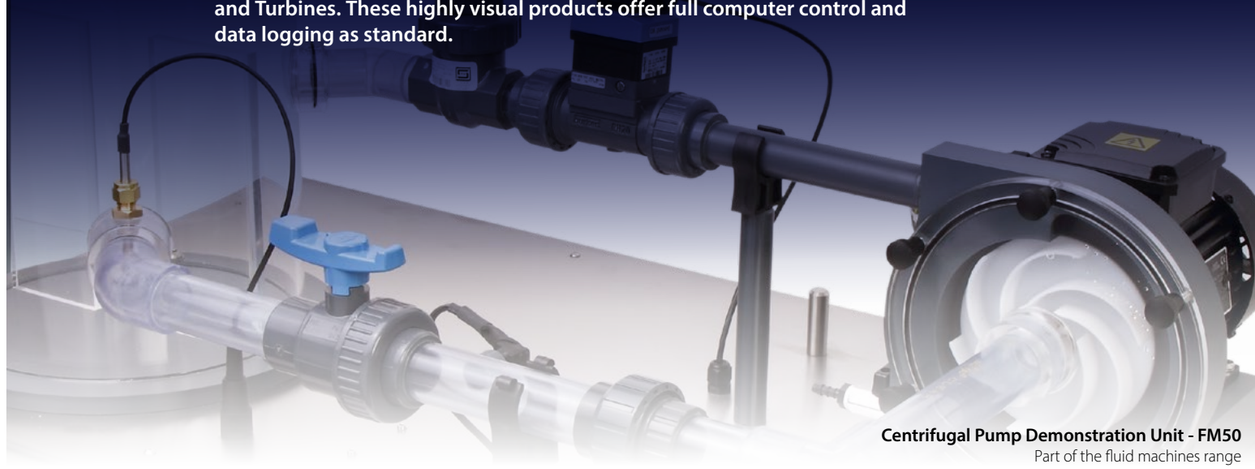
ChE ME CE IP

Scale

FM SERIES

Fans and Compressors

The Armfield Fluid Machines range introduces students to a range of desktop computer-controlled Turbo Machines covering Fans & Compressors, Pumps and Turbines. These highly visual products offer full computer control and data logging as standard.



Centrifugal Pump Demonstration Unit - FM50
Part of the fluid machines range

Centrifugal Fan Demonstration Unit - FM40

The centrifugal fan is a radial flow machine, which produces the necessary pressure to move gas by the centrifugal force built up inside the fan casing. The design of the fan blade has a primary influence on performance.

These types of fans are usually employed for ventilating duties requiring a somewhat higher delivery pressure than that available from axial fans.

Requirements: IFD 7

View data sheet: www.armfield.co.uk/fm40

ChE ME CE IP

Scale

Axial Fan Demonstration Unit - FM41

The axial fan produces gas flow by virtue of the momentum changes imparted across the rotary blades, parallel to the axis of rotation. Such fans are more suitable for higher flows at lower delivery pressures than their centrifugal counterparts.

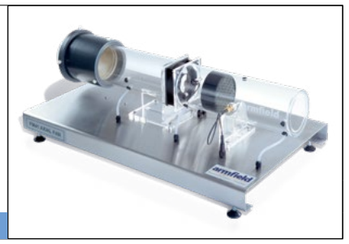
Comparison of the performance characteristics of the FM41 Axial Fan with those of the FM40 Centrifugal Fan thus provides an instructional exercise of valuable practical application.

Requirements: IFD 7

View data sheet: www.armfield.co.uk/fm41

ChE ME CE IP

Scale



Centrifugal Compressor Demonstration Unit - FM42

Multi-stage compressors are used industrially for high pressure deliveries of gas flows or suction duties.

The kinetic energy imparted to the gas by the impeller rotation is converted into pressure energy, which progressively increases from stage to stage

Requirements: IFD 7

View data sheet: www.armfield.co.uk/fm42

ChE ME CE IP

Scale

Centrifugal Pump Demonstration Unit - FM50

The centrifugal pump is the machine most commonly used to move liquids from one place to another. As such it's a particularly instructive unit, which introduces students to the whole subject of rotodynamic fluid machines.

Discovering the relationship between head, flow, rotational speed and power provides a framework of general applicability. For example, matching the required duty point to the conditions of maximum energy efficiency may be explored as a creative student project.

Requirements: IFD 7

View data sheet: www.armfield.co.uk/fm50

ChE ME CE IP

Scale

Series and Parallel Pumps Demonstration Unit - FM51

Centrifugal pumps are often used together to enhance either the flow rate or the delivery pressure beyond that available from the single pump.

The unit is designed to demonstrate the operational advantages of parallel or series operation, depending on the required duty.

Requirements: IFD 7

View data sheet: www.armfield.co.uk/fm51

ChE ME CE IP

Scale

Gear Pump Demonstration Unit - FM52

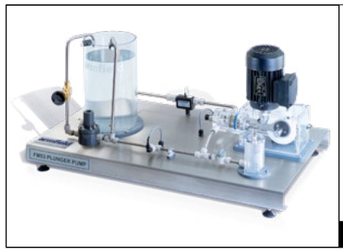
The gear pump is the most widely used of the positive action rotary pumps. Two gear wheels operate inside a casing. One is driven while the other rotates in mesh with it. The liquid is carried around in the space between consecutive teeth and then ejected as the teeth mesh. The pump has no valves. It is a positive displacement pump and will deliver against high pressures. The output is a more even flow than that of a reciprocating pump. It is particularly suitable for high-viscosity fluids.

Requirements: IFD 7

View data sheet: www.armfield.co.uk/fm52

ChE ME CE IP

Scale



Plunger Pump Demonstration Unit - FM53

The plunger or ram pump is a positive displacement pump and is used for pumping small quantities of liquid at high pressures. It is similar to a piston pump except that the sealing gland is at one end of the cylinder.

The reciprocating motion of the plunger gives an uneven flow, although the inclusion of a damping vessel can reduce this effect. Priming is unnecessary.

Requirements: IFD 7

View data sheet: www.armfield.co.uk/fm53

ChE ME CE IP

Scale

Interface Unit - IFD7

The interface between the FM units and the user's computer is provided by the Armfield IFD7 Interface Unit. This conditions the raw data from the sensors, digitises the data and transfers it to the computer using the USB interface. It also includes a sophisticated three phase inverter for providing accurate motor speed control, and a second motor drive output, all under software control.

Requirements: PC, USB, 1Ph, FM UNIT

View data sheet: www.armfield.co.uk/fm/ifd7

ChE ME CE IP

Scale

ChE Chemical Engineering
ME Mechanical Engineering
CE Civil Engineering
IP Industrial Processing

Turbine Service Unit - FM6X

A bench mounted unit consisting of a clear acrylic reservoir and a variable speed centrifugal pump, which provides water to power the accessory on test. The service unit also incorporates a water flow meter and electrically controlled dynamometer, which puts a load on to the turbine and measures the torque and speed.

FM6X Turbine Service Unit shown with FM62 Pelton Turbine Demonstration Unit.

Requirements: IFD 7

View data sheet: www.armfield.co.uk/fm6x

ChE ME CE IP

Scale

Axial Flow Impulse Turbine - FM60

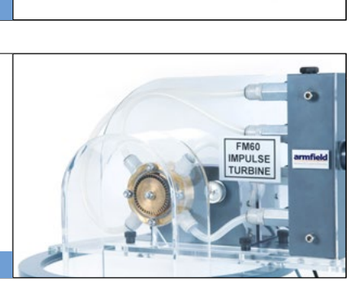
A miniature-scale axial flow, impulse turbine consisting of a brass runner, which is acted on by four jets of water. The flow to the turbine can be adjusted by changing the pump speed or closing off any of the nozzles. The turbine is housed in clear acrylic for excellent visibility. The unit is designed to mount on the FM6X Turbine Service Unit.

Requirements: FM 6X, IFD 7

View data sheet: www.armfield.co.uk/fm60

ChE ME CE IP

Scale



Radial Flow Reaction Turbine - FM61

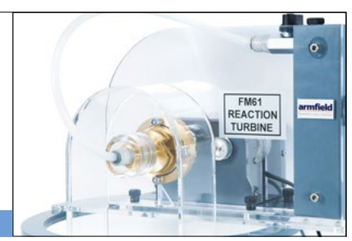
A miniature-scale radial flow reaction turbine, where water enters through a face seal and exits tangentially through two orifices. The reaction of these jets causes rotation of the runner. The turbine is housed in clear acrylic for excellent visibility. The unit is designed to mount on the FM6X Service Unit.

Requirements: FM 6X, IFD 7

View data sheet: www.armfield.co.uk/fm61

ChE ME CE IP

Scale



Pelton Turbine - FM62

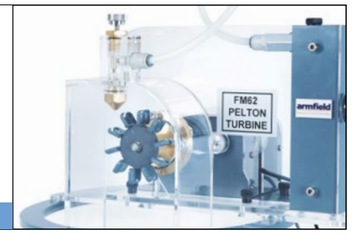
A miniature-scale Pelton wheel turbine, complete with a spear valve to control the water flow. The turbine buckets are shaped to extract maximum momentum from the passing jet of water, while the spear valve is designed to enable adjustment of the cross sectional area of the jet.

Requirements: FM 6X, IFD 7

View data sheet: www.armfield.co.uk/fm62

ChE ME CE IP

Scale



Propeller Turbine Demonstration Unit - FM63

A miniature-scale propeller turbine unit, which is supplied as a floor-standing unit complete with a sump tank and recirculating pump. The turbine is housed in clear acrylic pipe work permitting excellent visibility. The turbine is loaded by an electronically controlled brake fitted with a load cell to measure the torque.

Pump Test Accessory - FM64

The FM64 is a compact accessory, which allows the FM6X service unit to be used as a pump test accessory.

Requirements: PC, USB, 1Ph, IFD 7, FM UNIT

View data sheet: www.armfield.co.uk/fm63

ChE ME CE IP

Scale

armfield
Hydraulics & Hydrology

S SERIES

Armfield: suppliers of world-leading fixed bed and tilting flume technology, for over 50 years

Representing innovative product evolution, Armfield's latest series of fully configurable, modular flume systems are designed to exceed the requirements of research and teaching facilities alike.

Available as free discharge, recirculation or a combination of both; flumes systems are accompanied by a range of Hydraulic & Hydrology equipment that includes tanks, basins, experimentation models and instrumentation.

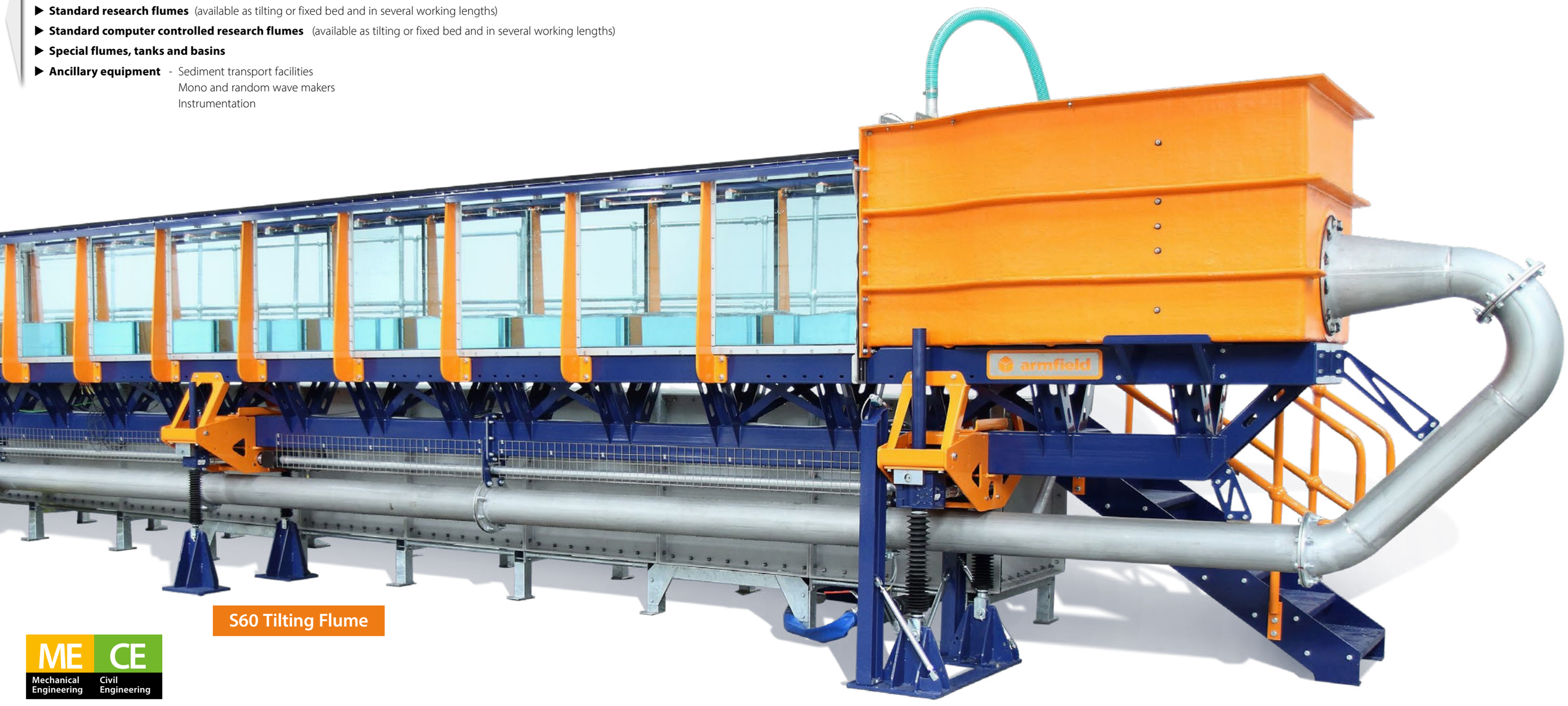
- **Standard research flumes** (available as tilting or fixed bed and in several working lengths)
- **Standard computer controlled research flumes** (available as tilting or fixed bed and in several working lengths)
- **Special flumes, tanks and basins**
- **Ancillary equipment** - Sediment transport facilities
  Mono and random wave makers
  Instrumentation

Armfield can design bespoke systems for your applications.

As with all of our equipment, we can install, commission and offer full training and on site maintenance.

Depending on customer requirements, channels can be designed to incorporate the following features:

- Fixed bed or variable slope
- Self-contained or laboratory supplied water
- Open circuit or re-circulating sediment load
- Choice of working section materials (glass, metal, wood)
- Inclusion of a wave generator and beach
- Instrumentation systems for flow, velocity, level, etc.
- Sediment sampling



S60 Tilting Flume

ME Mechanical Engineering
CE Civil Engineering

S60 Standard tilting Flume –15m University of South Africa
S6-MkII Standard tilting Flume –15m University of South Africa

Applications

ME Mechanical Engineering

CE Civil Engineering

S60 Standard tilting Flume –15m University of South Africa

Applied Hydraulics & Hydrology / S series

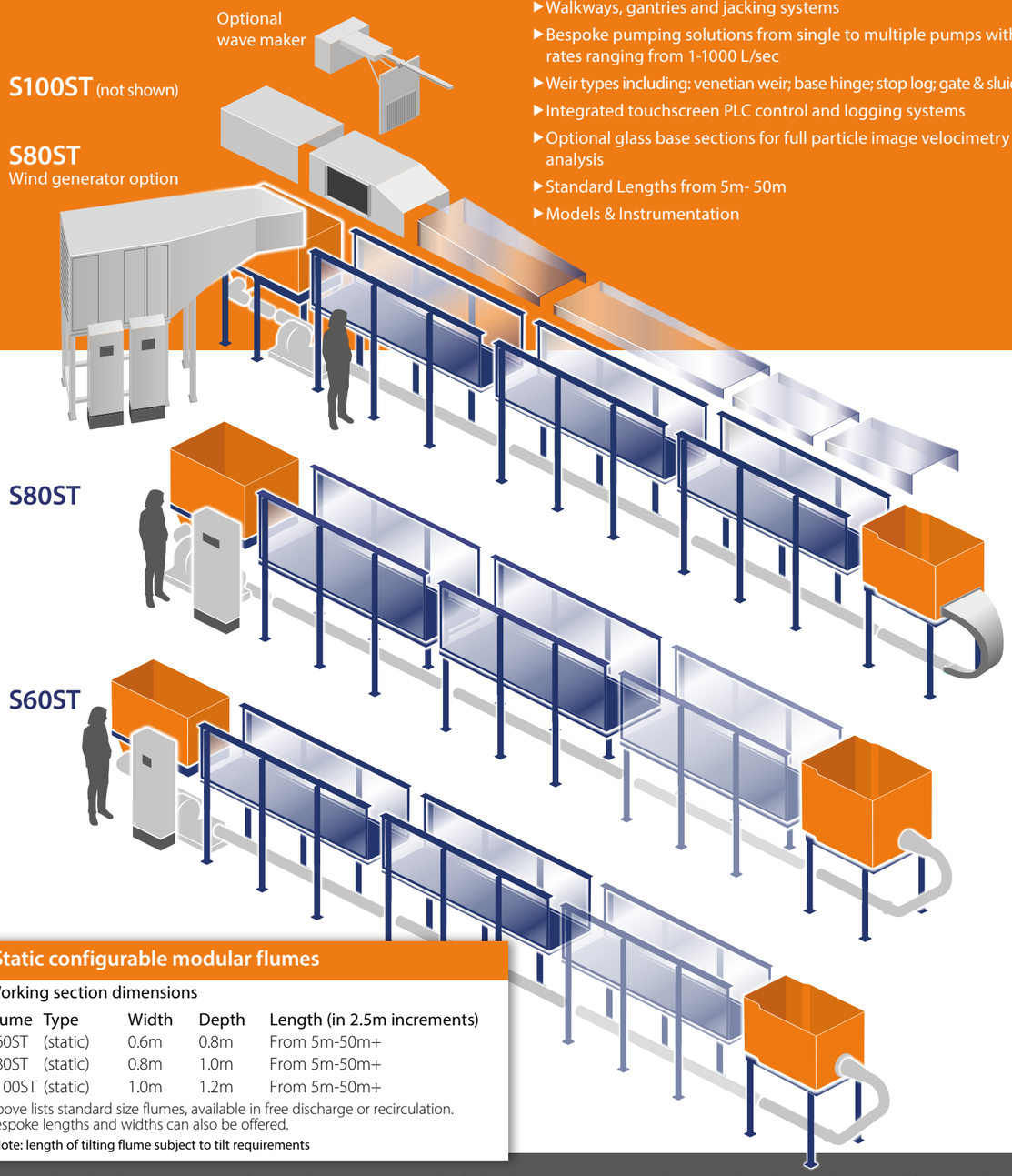
S100 Standard flume during construction and testing in the UK before installation at the BOKU Vienna Institute – 12.5m long, with future plans to extend it to 30m

S6-MkII Standard tilting flume – Xi'an University of Technology, China

Modular standard fixed bed and standard tilting bed flumes

Armfield flumes are engineered with the industry's most comprehensive range of options:

- ▶Control and acquisition
- ▶Sediment transport / feeding / weighing / extraction
- ▶Random and mono wave generation systems
- ▶Walkways, gantries and jacking systems
- ▶Bespoke pumping solutions from single to multiple pumps with flow rates ranging from 1-1000 L/sec
- ▶Weir types including: venetian weir; base hinge; stop log; gate & sluice
- ▶Integrated touchscreen PLC control and logging systems
- ▶Optional glass base sections for full particle image velocimetry (PIV) analysis
- ▶Standard Lengths from 5m- 50m
- ▶Models & Instrumentation



Static configurable modular flumes

Working section dimensions

Flume	Type	Width	Depth	Length (in 2.5m increments)
S60ST	(static)	0.6m	0.8m	From 5m-50m+
S80ST	(static)	0.8m	1.0m	From 5m-50m+
S100ST	(static)	1.0m	1.2m	From 5m-50m+

Above lists standard size flumes, available in free discharge or recirculation. Bespoke lengths and widths can also be offered.

*Note: length of tilting flume subject to tilt requirements

Flumes can be built to length in multiples of 2.5m working sections (add end & feed tanks, plus pumps and any other outboard ancillaries to obtain overall flume length and width)

Tilting configurable modular flumes

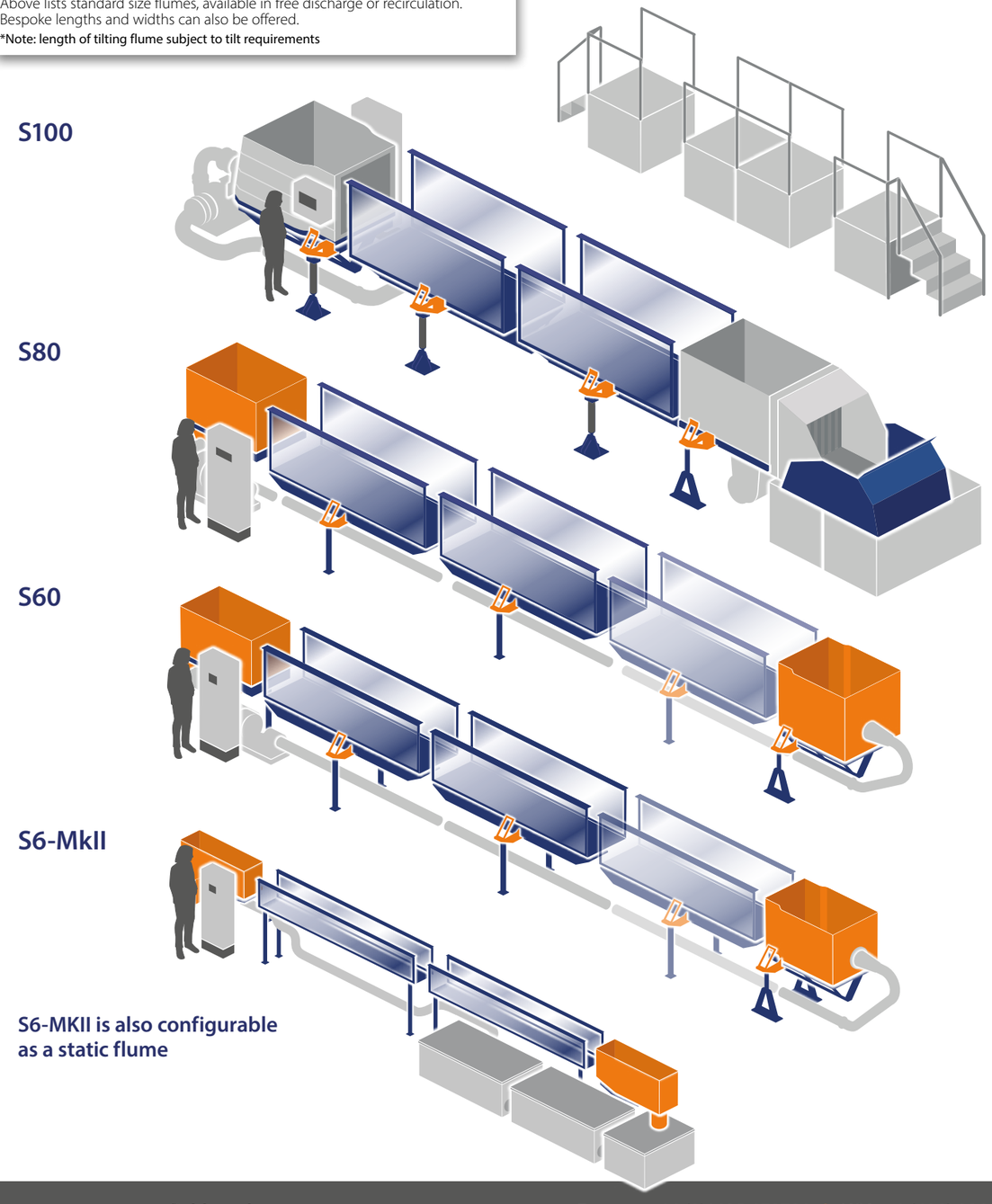
Working section dimensions

Flume	Type	Width	Depth	Length (in 2.5m increments)
S6-MkII	(tilting)	0.3m	0.45m	From 5m-15m
S60	(tilting)	0.6m	0.8m	From 5m-30m*
S80	(tilting)	0.8m	1.0m	From 5m-30m*
S100	(tilting)	1.0m	1.2m	From 5m-30m*

Above lists standard size flumes, available in free discharge or recirculation. Bespoke lengths and widths can also be offered.

*Note: length of tilting flume subject to tilt requirements

Modular walkway, tank & gantry systems for all flumes in our range



S6-MKII is also configurable as a static flume

Standard teaching and research flume – S6-MkII

0.3m wide x 0.45m deep x 2.5m section in increments of 2.5 meters up to 15 meters.

Options, models and instruments available

- Tilting up to 15 meters
- Sediment transport options
- Manual or electric jacking
- Data logging option

View data sheet: www.armfield.co.uk/standard_flumes ME CE

Requirements: 3Ph

Scale

Standard teaching and research flume – S60

0.6m wide x 0.8m deep x 2.5m sections

PLC control included

Options, models and instruments available

- Tilting up to 30 meters
- Static bed up to 50 meters
- Sediment transport options
- Weir options available
- Free discharge or recirculation configurations

View data sheet: www.armfield.co.uk/standard_flumes ME CE

Requirements: PC, USB, COLD, 3Ph

Scale

Standard teaching and research flume – S80

0.80m wide x 1.0m deep x 2.5m sections

PLC control included

Options, models and instruments available

- Tilting up to 30 meters
- Static bed up to 50 meters
- Sediment transport options
- Weir options available
- Free discharge or recirculation configurations

View data sheet: www.armfield.co.uk/standard_flumes ME CE

Requirements: PC, USB, COLD, 3Ph

Scale

Standard teaching and research flume – S100

1.0m wide x 1.2m deep x 2.5m sections

PLC control included

Options, models and instruments available

- Tilting up to 30 meters
- Static bed up to 50 meters
- Sediment transport options
- Weir options available
- Free discharge or recirculation configurations

View data sheet: www.armfield.co.uk/standard_flumes ME CE

Requirements: PC, USB, COLD, 3Ph

Scale

Sediment Erosion Flume – S28

A multipurpose, automated mobile research platform designed to facilitate the study of sediments and erosion, test medium can be in the form of core samples, general soil or vegetation samples.

Options, models and instruments available

- Sediment Core Module (150 x 75mm Section) (supplied as standard)
- Wide Erosion Studies Module (300 x 100mm Section) + Bridge Insert (option)
- Narrow Erosion Studies Module (150 x 50mm Section) + Bridge Insert (option)
- Sediment Core Module (105 x 50mm Section) (option)

View data sheet: www.armfield.co.uk/ ME CE

Requirements: 1Ph, COLD, DRAIN

Scale

Hydraulic instruments including gauges, manometers, Pitot tubes, probes and laser PIV system

Vernier Hook and Point Gauges - H1

A range of digital and vernier hook and point gauges for the measurement of steady state water surface position.

View data sheet: www.armfield.co.uk/h1 ME CE

Requirements

Scale

Manometers & Meters - H12

A range of general purpose manometers to measure differential water pressures up to approximately 12.6m H_20. Scales are graduated in 1mm divisions. Also available are versatile, hand-held, battery-operated Portable Pressure Meters.

These are capable of measuring water or air pressure ranges as below:

H12-8: 0 - 2000mBar (0 - 1500mmHg).

H12-9: 0 - 140mBar (0 - 99.99mmHg).

View data sheet: www.armfield.co.uk/h12 ME CE

Requirements

Scale

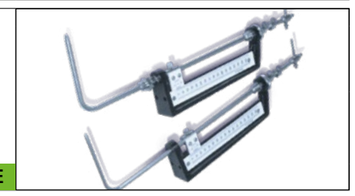
Computer Compatible Manometer Bank - H14/2

The Armfield H14/2 is designed to replace banks of manometers when used in conjunction with a number of Armfield products. Sixteen simultaneous pressure measurements can be displayed on a user supplied computer and the information data logged.

View data sheet: www.armfield.co.uk/h14-2 ME CE

Requirements: PC, USB

Scale



Pitot tubes - H30

A range of Pitot tubes for the measurement of water velocity in open channels and closed ducts. Tubes are in stainless steel and mounted on a supporting body with scale. Designed to be used with the H12 range of manometers.

View data sheet: www.armfield.co.uk/h30 ME CE

Requirements

Scale

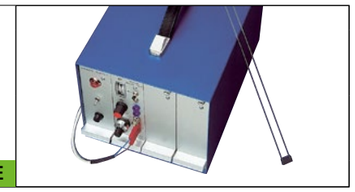
Propeller Velocity Meter - H33

Used to measure and record very low point velocities in water and other conductive fluids. Velocity range 25 to 1500mm/sec. Or 600 to 3000mm/sec using alternative sensing probes.

View data sheet: www.armfield.co.uk/h33 ME CE

Requirements: PC, USB

Scale



Wave Probe System - H40

A simple and robust instrument for the measurement and recording of water waves in hydraulic models and ship tanks, using the principle of measuring the electrical conductivity between two parallel wires.

View data sheet: www.armfield.co.uk/h40 ME CE

Requirements: 1Ph

Scale

Laser PIV system - H41

The H41 uses Particle Image Velocimetry (PIV) to nonintrusively measure, fluid velocities at multiple points in a flow, at a rate of up to 16Hz. The compact and portable hardware, (which uses a safe, nonpulsed, Class 3B laser) and the extremely easy to use software with real time display, make this an ideal tool for undergraduate teaching and demonstration.

View data sheet: www.armfield.co.uk/h41 ME CE

Requirements: PC, FIRE WIRE, >2GB MEM, 1Ph

Scale

Models and model insert for S6-MkII, S60, S80

Larger flume accessories are large, heavy and expensive. Resulting in storage and safe handling issues. The solution is a Perspex reduction section which uses our S6-MKII models and accessories

Flume Models – S6-MkII Standard flume

A comprehensive range of experimental models and measuring instruments is available for selection. These provide the basis for a large number of practical experiments in open channel flow including the use and operation of regulating and gauging structures.

Wherever possible non-corroding materials have been used to reduce maintenance time and increase the working life of the models.

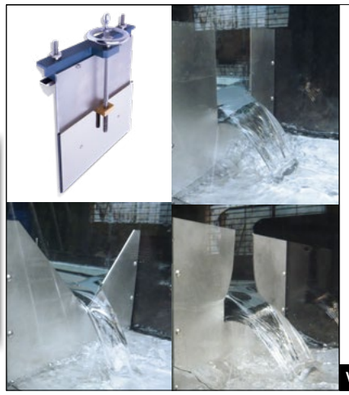


Plate Weirs - S6-20

- ▶ Screw operated adjustable undershot plate weir (Sluice gate)
- ▶ Mounting block, for a range of interchangeable plate weirs that are included in the supply:

- Sharp crested weir (with aeration pipe)
- Rectangular notch weir
- Trapezoidal notch weir
- 90° vee notch weir
- 60° vee notch weir
- Sutro notch weir (linear proportional weir)

User can fabricate & fit other weir types.

Requirements: S6MKII FLUME

Scale

View data sheet: www.armfield.co.uk/flumes ME CE

Broad Crested Weirs - S6-21

- ▶ Rectangular sharp cornered weir
- ▶ Rectangular streamlined weir

This type of weir is commonly used in the gauging of discharge in open channels, particularly where accuracy and reliability are required to be combined with ease of construction and maintenance.

Shown below is a traditional streamlined hump in operation, which may be compared with the crump weir.

Broad crested weir - theory:

$Q=1.704CdbH3/2$

$Cw \approx 0.85$ to 0.9

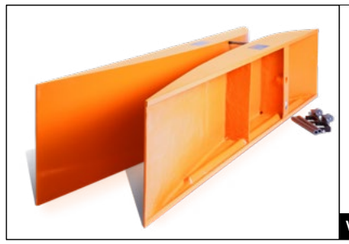
$hd \geq 0.67\ hu$

$ha \geq 0.40\ hu$

Requirements: S6MKII FLUME

Scale

View data sheet: www.armfield.co.uk/flumes ME CE



Venturi Flume - S6-22

A set of GRP mouldings for installation in the channel section to form a venturi flume.

Requirements: S6MKII FLUME

Scale

View data sheet: www.armfield.co.uk/flumes ME CE

Ogee Weir & Manometer Board - S6-23

Eight pressure tappings (2 upstream, 5 downstream, 1 at apex) complete with multi-tube piezometer board.

Requirements: S6MKII FLUME

Scale

View data sheet: www.armfield.co.uk/flumes ME CE

Dam Spillway Models - S6-24

Complete with the following interchangeable downstream sections:

> Spillway toe
> Roller bucket toe
> Apron with removable energy dissipator

Requirements: S6MKII FLUME

Scale

View data sheet: www.armfield.co.uk/flumes ME CE

Syphon Spillway - S6-25

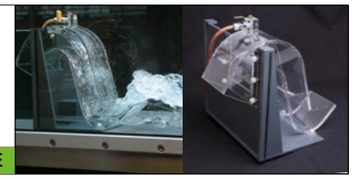
Complete with adjustable breather tube.

To determine the relationship between upstream head and flowrate through a siphon spillway in the 'Blackwater' fully primed condition. To calculate the discharge coefficient and to observe the operation of the siphon as it primes and de-primes.

Requirements: S6MKII FLUME

Scale

View data sheet: www.armfield.co.uk/flumes ME CE



Self-regulating Syphon - S6-26

To determine the relationship between upstream head and flowrate through a self-regulating (air regulated) siphon. To calculate the discharge coefficient, and to observe the operation of the siphon as it primes and de-primes.

Requirements: S6MKII FLUME

Scale

View data sheet: www.armfield.co.uk/flumes ME CE

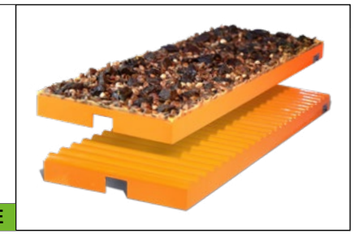
Roughened Beds - S6-27

Two sections of different roughness. Each consists of three modules arranged to cover a 2.5m length.

Requirements: S6MKII FLUME

Scale

View data sheet: www.armfield.co.uk/flumes ME CE



Vibrating Pile - S6-28

For the study of vortex shedding by piles and tall structures.

Requirements: S6MKII FLUME

Scale

View data sheet: www.armfield.co.uk/flumes ME CE

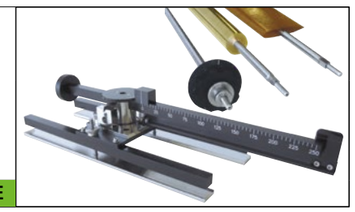
Lift & Drag Balance Models - S6-29

Three models - large, medium and small diameter cylinders with an aerofoil section.

Requirements: S6MKII FLUME

Scale

View data sheet: www.armfield.co.uk/flumes ME CE



Pitot Tube & Manometer Board - S6-30

Complete with traversing carriage and vernier height adjustment, and an inverted paraffin water manometer for magnification of small pressure differences.

Requirements: S6MKII FLUME

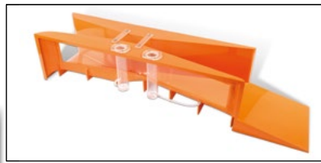
Scale

View data sheet: www.armfield.co.uk/flumes ME CE

Crump Weir - S6-31
Single pressure tapping at apex, complete with piezometer tube.

View data sheet: www.armfield.co.uk/flumes ME CE

Requirements S6MKII FLUME
Scale



Parshall Flume - S6-32
One of the most widely used standing wave flumes; allows comparison of head-flow characteristics with those published in the literature.

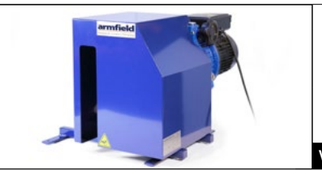
View data sheet: www.armfield.co.uk/flumes ME CE

Requirements S6MKII FLUME
Scale

WSC Flume - S6-33
Developed by Washington State College, this trapezoidal flume conforms more closely to natural channel sections and passes sediment even more freely than the Parshall Flume.

View data sheet: www.armfield.co.uk/flumes ME CE

Requirements S6MKII FLUME
Scale



Wave Generator - S6-35
Simple, regular, flap-type generator designed to be mounted on the flume discharge tank.

View data sheet: www.armfield.co.uk/flumes ME CE

Requirements S6MKII FLUME
Scale

Beach - S6-36
Wave absorption beach for use with S6-35 or S6-45 to reduce the effect of reflected waves.

View data sheet: www.armfield.co.uk/flumes ME CE

Requirements S6MKII FLUME
Scale

Zagni Flow Monitoring Systems - S6-37
Consists of a free standing manometer board and instrument carriage fitted with Pitot tube and interconnecting tubing. This system may be used to establish the basic parameters of fluid flow in the channel including, invert slope, surface profiles, pressure profiles and velocity profiles.

View data sheet: www.armfield.co.uk/flumes ME CE

Requirements S6MKII FLUME
Scale

Software Control and Data Acquisition Package - S6-MkII-DTA-ASUITE
The S6-MkII-DTA-ASUITE Software Control and Data Acquisition package includes an inverter within the control console for electronic speed control for the flow channel pump. It also includes the S6-MkII-DTA-ALITE data logging and instrumentation system.

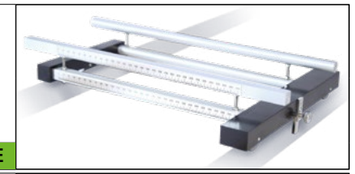
View data sheet: www.armfield.co.uk/flumes ME CE

Requirements S6MKII FLUME
Scale

Requirements S6MKII FLUME
Scale

Instrument Carrier - S6-40
Both longitudinal and transverse movement and position lock.

View data sheet: www.armfield.co.uk/flumes ME CE



Requirements S6MKII FLUME
Scale

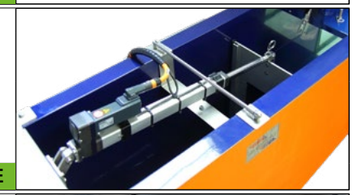
Velocity Meter and Mountings - S6-42
Velocity probe and digital meter, complete with mounting attachments to channel. Range 0.6. to 3m/sec.

View data sheet: www.armfield.co.uk/flumes ME CE

Requirements S6MKII FLUME
Scale

Random Wave Maker - S6-45
This machine utilises the base hinge weir in the discharge tank of the Armfield S6MkII Flume as the paddle. The S6-45 Control box interfaces with a personal computer (not supplied by Armfield) via a serial interface.

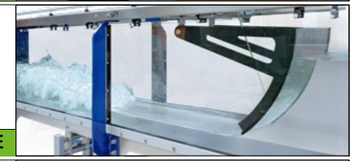
View data sheet: www.armfield.co.uk/flumes ME CE



Requirements S6MKII FLUME
Scale

Radial Gate - S6-46
The S6-46 Radial gate accessory allows the relationship between upstream head and flowrate beneath a radial gate under different operating conditions to be determined, it additionally allows the discharge coefficient in each condition to be calculated.

View data sheet: www.armfield.co.uk/flumes ME CE



Requirements S6MKII FLUME
Scale

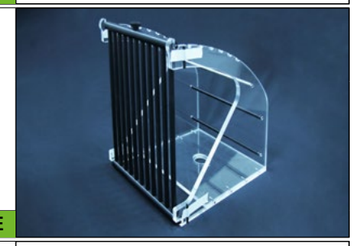
Set of Piers - S6-47
The S6-47 set of piers accessory contains a set of piers with multiple profiles: rectangular, square, circular, rounded, pointed-nosed. The different piers are used to observe Subcritical and supercritical discharge; Flow transition at and around piers; Backwater upstream of piers; Angle of attack and opening ratio and the effect of flow rate and flow depth on the scour pattern and deposition of bed materials downstream of the pier.

View data sheet: www.armfield.co.uk/flumes ME CE

Requirements S6MKII FLUME
Scale

Trash Rack - S6-48
Trash racks (screens or rakes, as they are also known), are designed to filter floating & submerged debris and aquatic life from waterways that may otherwise damage downstream structures, hydroelectric equipment and so on. The S6-48 Trash Rack accessory is used to determine the head-loss associated with trash rack design with regards to geometry of the rack spacing and the bar shape.

View data sheet: www.armfield.co.uk/flumes ME CE



Requirements S6MKII FLUME
Scale

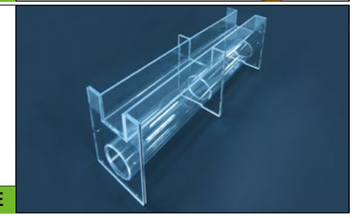
Sill - S6-49
S6-49 Sill Accessory is used to observe the flow patterns associated with the flow of water over a sill profile. It allows the behaviour of open channel flow at a reduction of flow cross-section to be investigated.

View data sheet: www.armfield.co.uk/flumes ME CE

Requirements S6MKII FLUME
Scale

Culvert - S6-50
S6-49 Sill Accessory is used to determine the characteristics and observe flow patterns obtained for water flowing through a culvert of both a rectangular and circular cross section. The culvert is used to observe the effect off free and submerged culvert inlet, and the culvert outlet with free or submerged discharge.

View data sheet: www.armfield.co.uk/flumes ME CE



Wind Generation / Wave Generation / Sediment Transport / Electrical Jacking / Reservoir Tanks

Armfield offer numerous options for incorporation into our range of large Flumes (S6, S60, S80, S100). Many of these options can be combined together to offer greater flexibility for simulation and research.

Wind generation

Armfield can offer the addition of wind simulation with a variable speed fan system connected to a clear cowling running over the flume. This can be operated in conjunction with wave generation and water flow conditions.

- **Wind simulation generation in excess of 20 meters per second**
- **Integrated control within our bespoke flume software**

Touch screen PLC flume control system
Incorporates full control and data logging

Images show surface condition effect using wind generation only

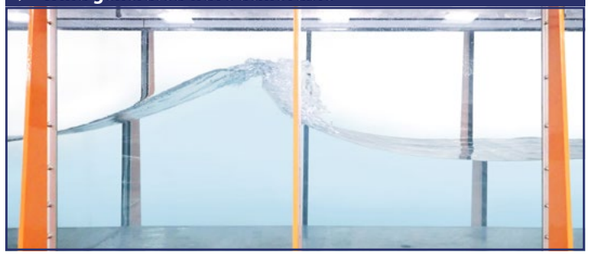
Integrated solution

At Armfield, we pride ourselves in our ability to develop bespoke Flume solutions to meet our customers exacting requirements. All Armfield flumes can be provided in full recirculation closed loop mode or free discharge using a range of control weirs (base hinge, venetian, stop log, vertical gate) flowing into supplementary tanks.

Wave generation

Wave generation and the effects of waves are significant areas of study. Whatever the application, Armfield can supply a complete system designed to suit the particular requirements.

- **Wave makers available for all flumes including C4 Flume**
- **Computer controlled via our bespoke software**
- **Wind generated wave achievable**



Wavemaker

Armfield can offer simple regular flap type Wavemaker or an advanced computer controlled Wavemaker. The advanced Wavemaking software produces an extensive range of regular and irregular wave spectra to meet the wide range of requirements from physical modelling activities.

Sediment Transport Recirculating sediment systems

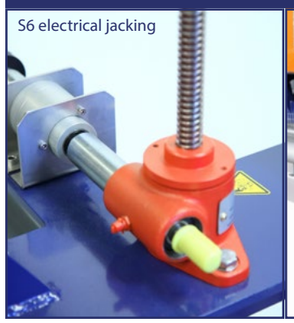
Armfield offer many sediment transport options including, through pump full transport, catch, sampling and weighing, extraction facilities and dedicated sediment transport circuits as shown below.

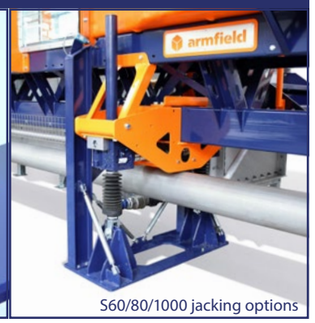
Basket weighing system

The need to gather data regarding the erosion of sediment in relevant experiments always presents a challenge. Armfield offer a weighing system that is efficient and easy to use. The system can be integrated into the software and allows the logging of weight against time.
A removable diverter plate assists to 'drop out' fast moving particulate.

Electrical jacking

This is available for S60, S80 and S100 flumes and the 10M upwards versions of S6-MkII.





S60/80/1000 jacking options

Reservoir tanks

Storage/reservoir tanks can be offered along with walkways mounted above to give access to the flume working section.

The S6 flumes are supplied with reservoir tanks as standard.

Drainage and Seepage Tank - S1

This self-contained facility is designed to enable a comprehensive study of flow through permeable media. Using sand and the various two dimensional models supplied, it is possible to determine flow lines, seepage rates and the distribution of uplift pressures.

A useful facility for student project work in engineering hydrology.

- Flow line visualisation
  Flow net construction
  Determining seepage rates
  Verification of Darcy's Law
  Comparison of experimental results with analytical solutions

Requirements: 1Ph, COLD

View data sheet: www.armfield.co.uk/21 ME CE

Scale

Rainfall Hydrographs - S10

A compact unit for the study of a variety of rainfall run off situations. A range of accessories enables the effects on the flood hydrograph of surface reservoir retention, depression, storage effects and land drainage to be demonstrated.

Requirements: 1Ph, COLD

View data sheet: www.armfield.co.uk/s10 ME CE

Scale

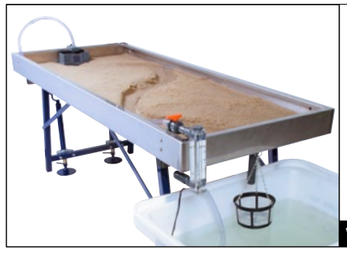
Ground Water Flow Unit - S11

A bench standing sand tank capable of demonstrating hydrological principles of ground water flow and the applications of these to certain water resource engineering constructions. Demonstrations of flood risks associated with land drainage works, the use of wells for both water abstraction, de-watering and the drainage of lakes and polders are all readily performed. The unit enables simple three-dimensional flow situations to be set up quickly and measurements of piezometric levels taken at appropriate positions within the model.

Requirements: 1Ph, COLD

View data sheet: www.armfield.co.uk/s11 ME CE

Scale



River Flow Simulator - S17

The Armfield S17 simulation tank demonstrates river feature formation, including flow and bed load motion. It provides an excellent introduction to the study of fluvial geomorphology and can also demonstrate sophisticated and advanced concepts for research purposes.

Requirements: 1Ph, COLD

View data sheet: www.armfield.co.uk/s17 ME CE

Scale

Installation and commissioning

Armfield offer global installation, commissioning and training.

If you need assistance please contact our professional services team.

ict@armfieldassist.com

Environmental Hydrology System - S12-MkII
Advanced Environmental Hydrology System - S12-MkII-50

This floor-standing Hydrology System includes features suitable for studying fluvial geomorphology. It combines the capabilities of the Rainfall Hydrographs and Ground Water Flow Unit into a single comprehensive facility. The system is fully instrumented for investigation of rainfall/run-off hydrographs, ground water abstraction studies and unique to this apparatus, fluvial mechanics.
Data logging accessory available.

- Includes the following accessories: Impermeable catchment - Permeable catchment - Cylinder - Rectangle - Rounded bridge pier - Streamlined bridge pier

Requirements: PC, USB, 1Ph, COLD

Scale

View data sheet: www.armfield.co.uk/s12 ME CE

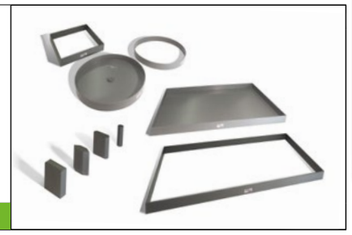
S12-Models for use with S12-MkII

An optional accessory is a set of shapes and models for use when investigating surface flow effects and run-off effects

Requirements

Scale

View data sheet: www.armfield.co.uk/s12 ME CE



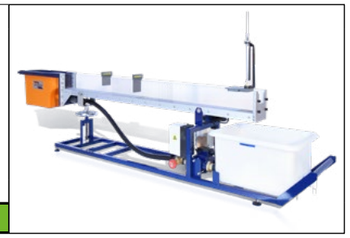
Sediment Transport Demonstration Channel - S8-MkII

The ability to vary both the slope and water flow rate enables the flume to generate a full array of alluvial bed forms. The development, stability and transition of the regimes may be followed visually and by measurements.

Requirements: 1Ph, COLD

Scale

View data sheet: www.armfield.co.uk/s8k ME CE



Mobile Bed and Flow Visualisation Tank - S2

A versatile apparatus for teaching, project and research work.
Available with 2.0m or 4.0m long working section.

The tank may be used in two principal fields of study:

- Hydraulic modelling of mobile bed situations such as water courses or civil engineering structures
- Two-dimensional flow visualisation using, for example, the Ahlborn dust indicator technique

Requirements: 1Ph, COLD

Scale

View data sheet: www.armfield.co.uk/s2 ME CE

Hydraulic Flow Demonstrator - S16

A free-standing accessory to the F1-10 Hydraulic Bench that enables hydraulic phenomena, associated with the flow of water through both open channels and close conduits, to be set up quickly, easily and visually demonstrated. Measurements taken in each configuration permit the associated flow conditions to be analysed.

An elevating section of the bed inside the channel and models of various hydraulic structures enable the difficult concepts of critical flow/velocity/depth and energy changes to be clearly demonstrated and analysed.

Models supplied include the Undershot Weir, Overshot Weir, Narrow crested Weir, Broad crested Weir, Ogee Weir and Culvert. In all cases, the effects of changes in upstream and downstream water level can be investigated.

Requirements: 1Ph, COLD

Scale

View data sheet: www.armfield.co.uk/s16 ME CE

armfield
Hydraulic Instruments

Vernier Hook and Point Gauge

The measurement of steady state water surface position is frequently needed during hydraulic investigations. This is done by using a small point or hook manually adjusted to touch the water surface, and a reading is taken of the vertical movement using a scale or vernier.

H1-1	150mm Scale Vernier Hook and Point Gauge
H1-2	300mm Scale Vernier Hook and Point Gauge
H1-3	450mm Scale Vernier Hook and Point Gauge
H1-7	300mm Scale Digital Hook and Point Gauge
H1-8	500mm Scale Digital Hook and Point Gauge
H1-10	Adjustable Tripod Stand
H1-11	Adjustable Tripod Stand with Mountings

View data sheet: www.armfield.co.uk/h1 — ChE ME CE IP

Requirements: Scale

Series Liquid Manometers

A range of general purpose laboratory manometers using liquid displacement to measure differential pressure. ***** *Important - Calibration Certificates must be ordered with the portable pressure meter*

H12-1	1m Scale Open Water Manometer
H12-2	1m Scale Pressurised Water Manometer
H12-3	1m Scale Water-Mercury Manometer
H12-4	500mm Scale Water-Mercury Manometer
H12-5	500mm Scale Kerosene-Water Manometer
H12-6	Free Standing Support Column
H12-7	Pressure Tapping System
H12-8	Basic Portable Pressure Meter
H12-8-CC1	Portable Pressure Meter c/w NPL 5 point calibration certificate
H12-8-CC2	Portable Pressure Meter c/w UKAS 10 point calibration certificate
H12-9	Portable Pressure Meter - 140mBar
H12-9-CC1	Portable Pressure Meter - 140mBar c/w NPL 5 point calibration certificate
H12-9-CC2	Portable Pressure Meter - 140mBar c/w UKAS 10 point calibration certificate

View data sheet: www.armfield.co.uk/h12 — ChE ME CE IP

Requirements: PC | USB

Scale

Computer Compatible Manometer Bank

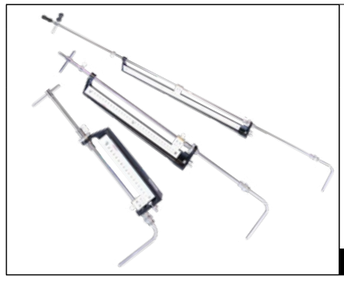
The Armfield H14/2 is designed to replace banks of manometers when used in conjunction with a number of Armfield products. 16 simultaneous pressure measurements can be displayed on a user-supplied computer, and the information data logged.

H14/2	Computer Compatible Manometer Bank

View data sheet: www.armfield.co.uk/h14 — ChE ME CE IP

Requirements: PC

Scale



Pitot Tubes

A range of Pitot tubes for the measurement of water velocity in open channels and closed ducts.

H30-1H	**150mm Pitot Tube**
H30-2H	**300mm Pitot Tube**
H30-3H	**450mm Pitot Tube**

View data sheet: www.armfield.co.uk/h30 — ChE ME CE IP

Requirements

Scale

Propeller Velocity Flowmeter

Used to measure and record very low point velocities in water and other conductive fluids, the H33 uses the change in impedance of a rotating multi-bladed impeller to indicate rotational speed caused by the flowing fluid.

H33-1	0.025-1.5 m/s Velocity Probe
H33-2	0.6-3 m/s Velocity Probe
H33-3	(+90 degree head), 0.025-2.5 m/s Velocity Probe
H33-10	Digital Indicator c/w 3m cable
H33-DTA-ALITE	Data Logger (formerly H33-11)

View data sheet: www.armfield.co.uk/h33 — ChE CE IP

Requirements: Scale

Wave Probe System

A simple and robust instrument for the measurement and recording of water waves in hydraulic models and ship tanks, which works on the principle of measuring the electrical conductivity between two parallel wires.

H40-1-1	Single 300mm Wave Probe System, complete
H40-1-2	Twin 300mm Wave Probe System, complete
H40-1-3	Triple 300mm Wave Probe System, complete
H40-2-1	Single 500mm Wave Probe System, complete
H40-2-2	Twin 500mm Wave Probe System, complete
H40-2-3	Triple 500mm Wave Probe System, complete

View data sheet: www.armfield.co.uk/h40 — ChE CE IP

Requirements: 1Ph

Scale

Laser PIV System

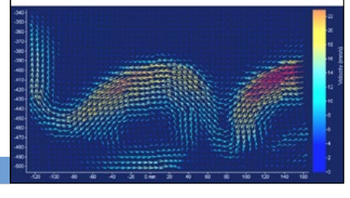
The compact, portable H41 Laser PIV System uses particle image velocimetry to measure, non-intrusively, fluid velocities at multiple points in a flow, at rates of up to 16Hz. An ideal, cost effective tool for research and demonstration.

H41-1	Standard rtCam & nanoLase PIV Kit
H41-3	20 degree Light Sheet Optic for nanoLase
H41-4	200g of Water Suitable Seeding Particles
H41-5	1.5m Tripod for the rtCam
H41-6	Snakearm with Magnetic Base for nanoLase
H41-7	Snakearm with G-Clamp Base for nanoLase

View data sheet: www.armfield.co.uk/h41 — ChE CE IP

Requirements: PC | USB

Scale

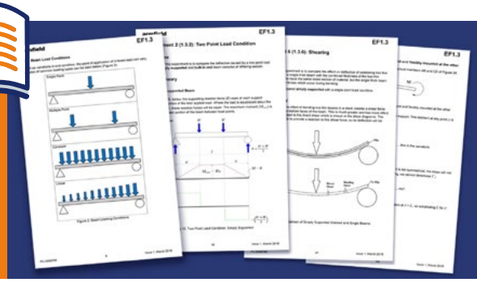


Armfield training manuals

All Armfield products are supplied with comprehensive teaching and curriculum material. As well as instructions on the setting-up, operation and maintenance of the equipment, Armfield also supply detailed Laboratory Teaching Exercises.

For each product there are numerous example exercises with sections on:

Objectives | Method | Theory | Equipment Set up | Procedure | Results



armfield
Water Treatment

W SERIES

Water treatment has not always been a public utility priority.

In today's environmentally aware world it is now an essential.

This range of simple yet comprehensive products covers the major elements of water treatment processes.

Several of the products can also be used industrially both for testing and experimentation.

Flocculation Test Unit - W1-MkII

This equipment is designed to allow students to investigate and compare the effect of different chemical dosages on coagulation and flocculation when treating water. The tests, called Jar Tests can be carried out on 6 different samples simultaneously.

Requirements: 1Ph

View data sheet: www.armfield.co.uk/w1 ChE CE IP

Scale

Sedimentation Studies Apparatus - W2-MkII

Bench mounted and backlit for ease of observation, this unit provides a facility for studying the basic physical processes involved in sedimentation, including zone formation and hindered settling.

Requirements: 1Ph

View data sheet: www.armfield.co.uk/w2 ChE CE IP

Scale

Permeability/Fluidisation Studies Apparatus - W3-MkII – armBUS integrated

This apparatus is designed for students to measure and understand the characteristics of flow through a bed of particles. Such flows occur naturally and in process plant designs. It may also be used for a part of the testing of media for water and waste water treatment processes.

Requirements: 1Ph, PC, USB

View data sheet: www.armfield.co.uk/w3 ChE CE IP

Scale

Filterability Index Unit - W4-MkII – armBUS integrated

The unit enables a water treatment test to be made on a suspension to be filtered through sand or similar granular media.
Whilst developed as a teaching tool, it can also be used in routine control at waterworks, or at a sewage treatment works that employs tertiary filtration.

Requirements: 1Ph, PC, USB

View data sheet: www.armfield.co.uk/w4 ChE CE IP

Scale

Deep Bed Filter Column - W5-MkII – armBUS integrated

This laboratory deep bed filter column has been designed to operate identically to full-scale granular filters. Using the same bed depth and filter media, tests on this unit provide operational data, which may be scaled up to full size. Pilot trials of possible filter designs for water and sewage works can be made reliably at low cost.

Requirements: 1Ph, PC, USB, COLD

View data sheet: www.armfield.co.uk/w5 ChE CE IP

Scale

Model Sedimentation Tank - W7-MkII

This unit has been designed to demonstrate the hydraulic characteristics and settling efficiencies of a model settling basin. Although scale-up to industrial size sedimentation tanks is difficult, relevant deductions can be made as to how nonuniform flows occur and how these interact with the settling characteristics of particular suspensions.

Requirements: 1Ph, COLD

View data sheet: www.armfield.co.uk/w7 ChE CE IP

Scale

Anaerobic Digester - W8

Anaerobic treatment processes involve bacteria, which function only in the absence of air. This digester is designed as a bench top training facility and as a means of providing operational process data for plant design purposes.

Requirements: 1Ph

View data sheet: www.armfield.co.uk/w8 ChE CE IP

Scale

Ion Exchange Unit - W9-MkII – armBUS integrated

A low cost, bench mounted unit designed to demonstrate the use of ion exchange resins for either continuous water softening or demineralisation. The equipment is designed to emulate the industrial operation of such units, including monitoring 'break-through' and regeneration cycles.

Requirements: 1Ph, PC, USB

View data sheet: www.armfield.co.uk/w9 ChE CE IP

Scale

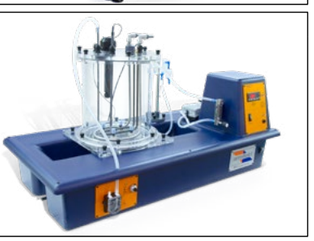
Aeration Unit - W10-MkII – armBUS integrated

The purpose of this aeration unit is to permit the study of the oxygen transfer characteristics of diffused air systems including the physical and chemical parameters that influence their oxygenation capacity. These studies are a necessary prelude to the understanding of the biological treatment of waste waters.

Requirements: 1Ph, PC, USB

View data sheet: www.armfield.co.uk/w10 ChE CE IP

Scale



Aerobic Digester - W11

The continuous activated sludge process has been successfully employed in public health engineering installations for nearly a century.

The bench top aerobic digester is a comprehensive study facility of this biological water treatment process using a safe, synthetically prepared waste water.

Chilled Water Circulation Unit - CW-17 (Option)

Requirements: 1Ph

View data sheet: www.armfield.co.uk/w11 ChE CE IP

Scale

FE SERIES

Irrigation Water Management

With continued population growth in parts of the world where growing crops is most challenging, irrigation is the obvious way to maximise the potential.

This range of products offers both laboratory and field-learning opportunities. It also introduces such diverse topics as gauging and control structures plus evapotranspiration.

Soil/Water Model Tank - FEL2

The Armfield Ltd Surface Irrigation Apparatus, FEL2 has been developed to help students of irrigation understand more fully the interaction of factors which influence water movement both on the soil surface and in the soil profile. The equipment allows actual surface irrigation experiments to be performed on a small scale in the laboratory.

Requirements: 1Ph, COLD

Scale

View data sheet: www.armfield.co.uk/fel2 CE IP

Rainfall Simulator - FEL3

The FEL3 Simulator can also be used in the laboratory or in the field for a wide range of research from studies of infiltration under sprinkler irrigation to estimating soil loss in high intensity tropical storms. Erodibility of soils can be studied in the laboratory and the influence of crop cover on the effect of rainfall can also be investigated. It is ideal for investigating the relationship between rainfall and soil erosion, the nature of soil erosion potential on different soil types and identifying methods by which erosion may be prevented. The simulator incorporates:

- Aperture adjustment
- Field and lab test plots
- Tilting stand
- Rain gauges

Requirements: 1Ph, COLD

Scale

View data sheet: www.armfield.co.uk/fel3 CE IP

Soil Moisture Suction Sand Table - FEL4

Primarily for the derivation of soil moisture characteristic curves, the FEL4 helps in understanding the principle of water retentivity and its relationship with soil moisture levels.

Requirements: 1Ph, COLD

Scale

View data sheet: www.armfield.co.uk/fel4 CE IP

Demonstration Infiltration Apparatus - FEL5-MkII

A simple but effective laboratory demonstration of the infiltration processes, which are fundamental to any form of irrigation study.

The unit comprises three transparent cylinders in which soil samples are placed. Water poured onto the soil surface can then be observed as it infiltrates the sample.

Requirements: COLD

Scale

View data sheet: www.armfield.co.uk/fel5 CE IP

Demonstration Lysimeter - FEL6

The Armfield Lysimeter consists of three 300mm diameter containers in which a variety of crop types can be grown in any soil type.

Each container can then in turn be placed on a hydraulically mounted plate, which is used to monitor system weight changes arising from evapotranspiration, precipitation and drainage.

Despite its simplicity, the apparatus has a high degree of sensitivity and may be used for student project work as well as for demonstration purposes.

Requirements: COLD

Scale

View data sheet: www.armfield.co.uk/fel6 CE IP

Drain Permeameter - FEL10

The FEL10 Drain Permeameter apparatus provides the student with a way of studying the interactions between drains, soils and filters in the laboratory. The apparatus consists of a constant head permeator which allows the study of various combinations of soils, filters and drain types. Changes in permeability with time can be estimated by measuring the rate of drainage of water from the permeator. The part of the soil/drain system which is changing its permeability can be inferred from the series of piezometer tubes which are connected to the cylinder of the permeator.

Requirements: COLD

Scale

View data sheet: www.armfield.co.uk/fel10 CE IP

Parshall Flumes - FEX26-1/2/3

Named after the inventor, this widely used flume causes little head loss and passes sediment readily. Constructed in GRP, flumes are supplied with measuring scales, spirit levels and calibration curves.

Requirements

Scale

View data sheet: www.armfield.co.uk/fex26 CE IP

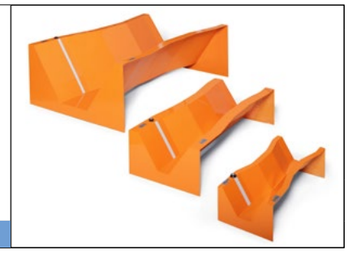
WSC Flumes - FEX26-4/5/6

This trapezoidal design of flume, developed by Washington State College (WSC) for field irrigation, has the advantages over the rectangular flume of giving a greater depth range, of conforming more closely to the channel section and of allowing sediment to pass more freely.

Requirements

Scale

View data sheet: www.armfield.co.uk/fex26 CE IP



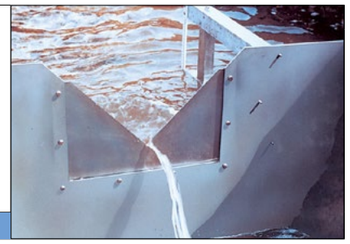
Thin Plate Weirs & Accessories - FEX26-7

Armfield Thin Plate Weirs are constructed of stainless steel and mounted on a painted weir plate carrier, which can set either into the banks and bed of a small stream or fixed to the end of a concrete channel. A simple head scale is attached to each weir plate but a stilling well can be fitted for greater accuracy.

Requirements

Scale

View data sheet: www.armfield.co.uk/fex26 CE IP



Thermodynamics

Thin Plate Weirs & Accessories - FEX26-8
Stilling well with depth gauge comprising hook and point gauge.

Requirements

View data sheet: www.armfield.co.uk/fex26 CE IP

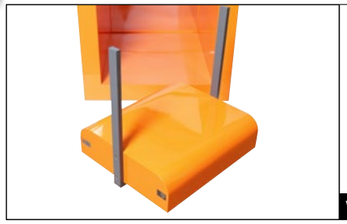
Scale

Channel Section - FEX26-9
A lightweight channel section made from corrosion-resistant material with the provision for easy mounting of the FEX26-10/11.

Requirements

View data sheet: www.armfield.co.uk/fex26 CE IP

Scale

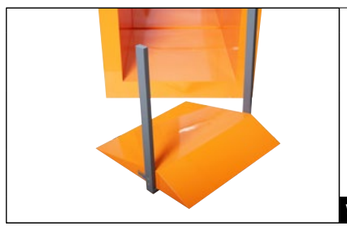


Broad Crested Weir - FEX26-10
Used for controlling upstream water levels and measuring discharge rate. The weir is set perpendicular to the flow across the channel bed. It is particularly useful in sediment-laden waters that can be detrimental to sharp edged weirs. Made from durable glass-reinforced plastic.

Requirements

View data sheet: www.armfield.co.uk/fex26 CE IP

Scale



Crump Weir - FEX26-11
Named after its designer, C S Crump, this broad-crested weir is triangular in section making it less likely to trap silt and debris. The weir is used for accurate measurement of discharge rates. Made from durable glass reinforced plastic.

Requirements

View data sheet: www.armfield.co.uk/fex26 CE IP

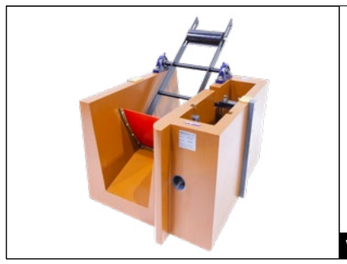
Scale

Sluice Gates - FEX40-3/4
The two types of adjustable sluice gate, undershot and overshot, are widely used for the control of water in canal systems. In the absence of more accurate devices they may be used for the approximation of flow rates.

Requirements

View data sheet: www.armfield.co.uk/fex40 CE IP

Scale



Automatic Water Control Gates - FEX40-5/6/7
Automatic control gates are used extensively in canal systems for regulating water levels and discharge. They are usually float operated and are designed to maintain constant levels in the canal so that discharges from offtakes can be kept at a constant known rate. Armfield are able to supply models of three types of commonly used gate:

Float Operated Radial Gate - FEX40-5
Float Operated Tilting Gate - FEX40-6
Float Operated Weir Gate - FEX40-7

Requirements

View data sheet: www.armfield.co.uk/fex40 CE IP

Scale

The TH range is designed to introduce the fundamental principles of thermodynamics to the student.

The range of equipment starts at basic concepts such as temperature and pressure measurement and leads on to introducing the relationships between these fundamentals, the first and second law of thermodynamics, the principles of reversibility, entropy, enthalpy etc.

The equipment allows the student to gain a true understanding of these principles.

Temperature Measurement and Calibration - TH1
The TH1 'Temperature Measurement and Calibration' apparatus that has been designed to introduce students to temperature and how different techniques can be employed to measure this variable. The system is supplied with three different heat sources and five different temperature sensors. To demonstrate the thermometric properties of different temperature sensors and the use of fixed points for calibration.

Educational Software and Data logging is optionally available - TH-DTA-ALITE

Requirements 1Ph

Scale

View data sheet: www.armfield.co.uk/th1 ChE ME CE IP

Pressure Measurement and Calibration - TH2
The TH2 'Pressure Measurement and Calibration' apparatus that has been designed by Armfield to introduce students to pressure and how different techniques can be employed to measure this variable. Different fixed pressures are generated using a simple Dead-weight Pressure Calibrator for calibrating the measuring devices. A Bourdon type pressure gauge and electronic type pressure sensor are connected to the calibrator to allow their characteristics, including accuracy and linearity, to be determined.

Educational Software and Data logging is optionally available - TH-DTA-ALITE

Requirements 1Ph

Scale

View data sheet: www.armfield.co.uk/th2 ChE ME CE IP

Saturation Pressure - TH3
The TH3 'Saturation Pressure' apparatus that has been designed to introduce students to the concept of saturation pressure and how different techniques can be employed to measure this variable. The system allows students to investigate the behaviour of a fluid at its boiling point and how the temperature varies with pressure. It also provides the capability to determine the condition of the wet steam produced by the apparatus. Saturation curves can be obtained & compared with published steam tables.

Educational Software and Data logging is optionally available - TH-DTA-ALITE

Requirements 1Ph

Scale

View data sheet: www.armfield.co.uk/th3 ChE ME CE IP

Recycle Loops - TH4
The Armfield TH4 'Recycle Loops' apparatus that has been designed to demonstrate clearly, both visually and experimentally, what recycle is and to allow mass and energy balances to be performed under steady state and unsteady state conditions.

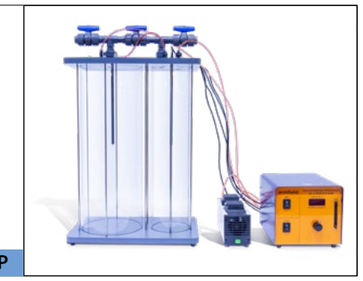
The system includes experimentation and calculation of the heat transfer rate at a range of recycle rates, using the steady flow energy equation.

Educational Software and Data logging is optionally available - TH-DTA-ALITE

Requirements 1Ph COLD

Scale

View data sheet: www.armfield.co.uk/th4 ChE ME CE IP



Expansion Processes of a Perfect Gas - TH5
The TH5 'Expansion Processes of a Perfect Gas' apparatus that has been designed to introduce students to a range of basic thermodynamic processes using air as the working fluid.

The system enables investigation into the behaviour of a gas under pressure and vacuum, to determine the ratio of specific heats. Includes concepts such as Adiabatic, Isothermal, Reversible and Irreversible Processes.

Educational Software and Data logging is optionally available - TH-DTA-ALITE

Requirements 1Ph

Scale

View data sheet: www.armfield.co.uk/th5 ChE ME CE IP

armfield
Heat Exchanger

HT SERIES Computer Controlled Heat Exchanger

The Armfield range of small scale heat exchangers comprises units which represent the common types of heat exchanger found in industry and demonstrate different techniques for indirect transfer of heat from one fluid stream to another. Their small size produces a fast system response to changes in variables such as water flow rate and temperature, so that training exercises can be carried out in a relatively short space of time.

Computer-Controlled Heat Exchanger Service Module - HT30XC

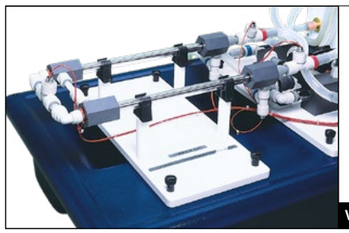
Computer-controlled heat exchange service unit, with a range of seven interchangeable heat exchangers.

All operational functions, including control of co- and counter-flow are now under computer control, and safety functions implemented to shut down the system in case of software or communication breakdown.

Requirements: 1Ph, COLD

View data sheet: www.armfield.co.uk/heat_transfer — ChE ME CE IP

Scale



Tubular Heat Exchanger - HT31

The tubular heat exchanger is the simplest form of heat exchanger and consists of two concentric (coaxial) tubes carrying the hot and cold fluids. The HT31 is a basic version with two sections and a single interim temperature measurement point.

Requirements: HT 30XC

View data sheet: www.armfield.co.uk/heat_transfer — ChE ME CE IP

Scale

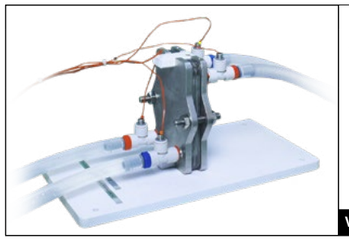


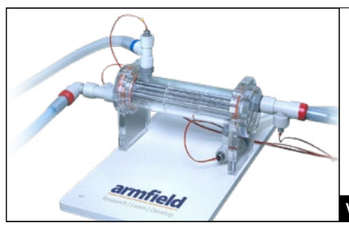
Plate Heat Exchanger - HT32

The HT32 has a single heating section configured for multi-pass operation with passes in series. It comprises seven individual plates, which are clamped together using two stainless steel threaded bars and nuts. It is possible to dismantle and reassemble the heat exchanger using only three plates to demonstrate a single pass.

Requirements: HT 30XC

View data sheet: www.armfield.co.uk/heat_transfer — ChE ME CE IP

Scale



Shell and Tube Heat Exchanger - HT33

The shell and tube heat exchanger is commonly used in the food and chemical process industries. This type of exchanger consists of a number of tubes in parallel enclosed in a cylindrical shell. Heat is transferred between one fluid flowing through the tubes and another fluid flowing through the cylindrical shell around the tubes.

Requirements: HT 30XC

View data sheet: www.armfield.co.uk/heat_transfer — ChE ME CE IP

Scale

Jacketed Vessel with Coil and Stirrer - HT34

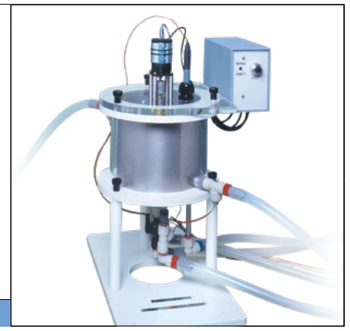
Vessel heating or cooling of a process liquid in a tank, either batchwise or with continuous product feed, is common practice throughout industry.

The characteristics of the heat transfer using an external jacket or internal coil can be demonstrated together with the effect of stirring the vessel contents.

Requirements: HT 30XC

View data sheet: www.armfield.co.uk/heat_transfer — ChE ME CE IP

Scale



Cross Flow Heat Exchanger - HT35

The Cross Flow Heat Exchanger is commonly used in applications such as heating, ventilating and air conditioning. It is also encountered as vehicle engine radiator.

This type of heat exchange occurs when the flow direction of the two fluids cross each other. In the HT35, hot water flows in and out of a radiator, perpendicular to air stream, which is being pulled into the radiator by an axial fan. The convection between the two fluids through fins surface on the radiator implements the heat exchange.

Requirements: HT 30XC

View data sheet: www.armfield.co.uk/heat_transfer — ChE ME CE IP

Scale

Extended Tubular Heat Exchanger - HT36

The tubular heat exchanger is the simplest form of heat exchanger and consists of two concentric (coaxial) tubes carrying the hot and cold fluids. In these miniature versions the tubes are separated into sections to reduce the overall length and to allow the temperature at points along both fluid streams to be measured.

Requirements: HT 30XC

View data sheet: www.armfield.co.uk/heat_transfer — ChE ME CE IP

Scale

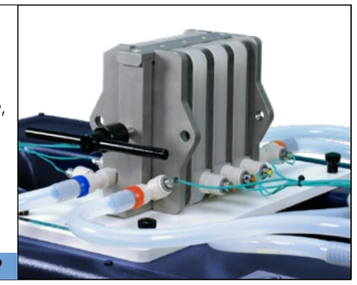
Extended Reconfigurable Plate Heat Exchanger - HT37

The HT37 is designed to be reconfigurable by the student, and can accommodate up to four sections of heating, each section providing an additional temperature measurement point for each fluid stream. In order to make the unit easy to reconfigure, these sections are supplied as preassembled groups of plates complete with an intermediate plate (containing the temperature measurement points).

Requirements: HT 30XC

View data sheet: www.armfield.co.uk/heat_transfer — ChE ME CE IP

Scale

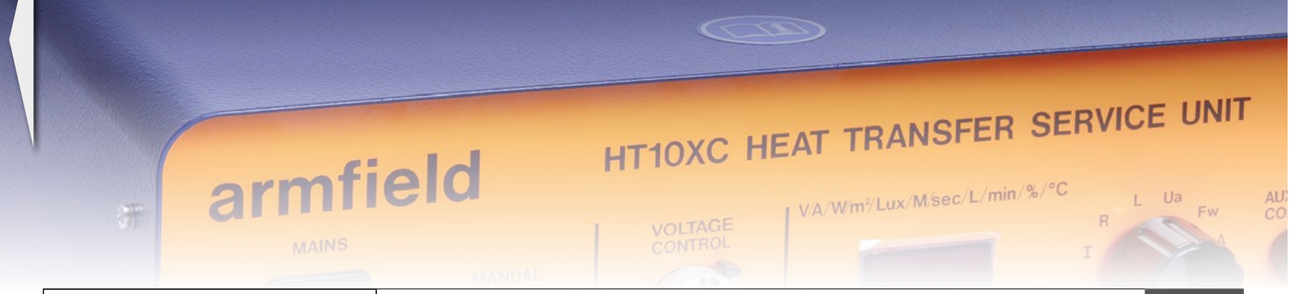


Heat Transfer

HT SERIES

Computer Controlled Heat Transfer

A range of small scale heat transfer equipment to demonstrate the three basic modes of heat transfer (conduction, convection and radiation). The heat transfer accessories may be individually connected to the HT10XC service unit, which provides the necessary electrical supplies and measurement facilities for investigation and comparison of the different heat transfer characteristics.



Computer-Controlled Heat Transfer Teaching Equipment - HT10XC

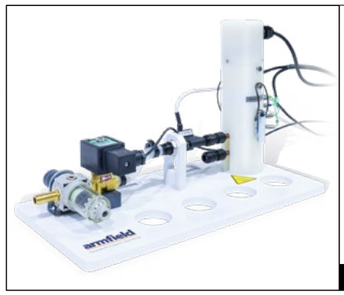
The Armfield HT10XC is a service unit that can be used in conjunction with a range of small-scale accessories for a wide range of demonstrations into the modes of heat transfer. The factors that affect heat transfer can be investigated and some of the practical problems associated with the transfer of heat can be clearly demonstrated.

Requirements: PC, USB, 1Ph

View data sheet: www.armfield.co.uk/ht10xc

ChE ME CE IP

Scale



Linear Heat Conduction - HT11

Linear Heat Conduction - HT11C (Computer Controlled)

The **HT11 / HT11C** are designed to demonstrate the application of the Fourier rate equation to simple steady-state conduction in one dimension.

The units can be configured as a simple plane wall of uniform material and constant cross sectional area, or as composite plane walls with different materials or changes in cross-sectional area. This enables the principles of heat flow by linear conduction to be investigated.

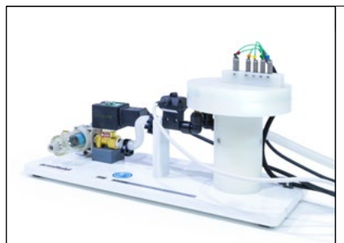
Flow Sensor - SFT2 (Optional accessory)

Requirements: COLD, HT 10XC

View data sheet: www.armfield.co.uk/heat_transfer

ChE ME CE IP

Scale



Radial Heat Conduction - HT12

Radial Heat Conduction - HT12C (Computer Controlled)

The **HT12 / HT12C** have been designed to demonstrate the application of the Fourier rate equation to simple steady-state conduction radially through the wall of a tube. The arrangement, using a solid metal disk with temperature measurements at different radii and heat flow radially outward from the centre to the periphery, enables the temperature distribution and flow of heat by radial conduction to be investigated.

Requirements: COLD, HT 10XC

View data sheet: www.armfield.co.uk/heat_transfer

ChE ME CE IP

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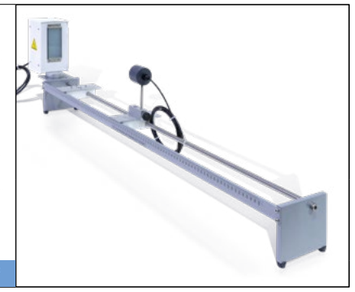


Laws of Radiant Heat Transfer and Radiant Heat Exchange - HT13

The HT13 has been designed to demonstrate the laws of radiant heat transfer and radiant heat exchange using light radiation to complement the heat demonstrations where the use of thermal radiation would be impractical.
The equipment supplied comprises an arrangement of energy sources, measuring instruments, aperture plates, filter plates and target plates, which are mounted on a linear track, in different combinations, to suit the particular laboratory teaching exercise chosen.

Requirements: HT 10XC

View data sheet: www.armfield.co.uk/heat_transfer

ChE ME CE IP

Scale

Combined Convection and Radiation - HT14

Combined Convection and Radiation - HT14C (Computer Controlled)

A hot surface loses heat (heat is transferred) to its surroundings by the combined modes of convection and radiation. In practice these modes are difficult to isolate, so an analysis of the combined effects at varying surface temperature and air velocity over the surface provides a meaningful teaching exercise.

Requirements: 1Ph, HT 10XC

View data sheet: www.armfield.co.uk/heat_transfer

ChE ME CE IP

Scale

Extended Surface Heat Transfer - HT15

A long horizontal rod, which is heated at one end, provides an extended surface (pin) for heat transfer measurements. Thermocouples at regular intervals along the rod allow the surface temperature profile to be measured.

Requirements: HT 10XC

View data sheet: www.armfield.co.uk/heat_transfer

ChE ME CE IP

Scale

Radiation Errors in Temperature Measurement - HT16

Radiation Errors in Temperature Measurement - HT16C (Computer Controlled)

In this equipment a group of thermocouples are used to measure the temperature of a stream of air, at ambient temperature, passing through the centre of a duct while the wall of the duct is elevated in temperature to subject the thermocouples to a source of thermal radiation.

Requirements: 1Ph, HT 10XC

View data sheet: www.armfield.co.uk/heat_transfer

ChE ME CE IP

Scale

Unsteady-State Heat Transfer - HT17

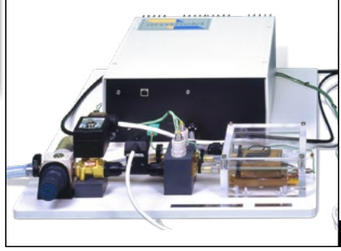
Analytical solutions are available for temperature distribution and heat flow as a function of time and position for simple solid shapes, which are suddenly subjected to convection with a fluid at a constant temperature. Simple shapes are provided together with appropriate classical transient-temperature/heat-flow charts, which enable a fast analysis of the response from actual transient measurements.

Requirements: 1Ph, HT 10XC

View data sheet: www.armfield.co.uk/heat_transfer

ChE ME CE IP

Scale



Thermo-electric Heat Pump - HT18C

Based on a Peltier device, the Armfield HT18C Thermo-electric Heat Pump demonstrates how electrical power can be used to extract heat from a cool surface and transfer it to a hot surface. This effect is becoming widely used for point cooling (eg of semiconductor devices) and small-scale volumetric cooling.

Requirements: 1Ph, HT 10XC, COLD

View data sheet: www.armfield.co.uk/heat_transfer

ChE ME CE IP

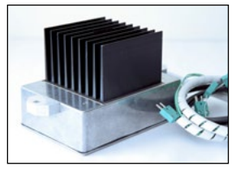
Scale

Free and Forced Convection - HT19

The Armfield Free and Forced Convection unit has been specifically designed to demonstrate the phenomena of natural (free) and forced convection. Temperature profiles and heat flux over three different heat transfer surfaces can be easily studied.

Cylindrical pin surface

Finned surface



Flat plate surface

Requirements: 1Ph, HT 10XC

View data sheet: www.armfield.co.uk/heat_transfer

ChE ME CE IP

Scale

Conductivity of Liquids and Gases - HT20

Conductivity of Liquids and Gases - HT20C (Computer Controlled)

The Armfield Conductivity of Liquids and Gases unit has been specifically designed to enable students to measure and compare the thermal conductivities of various liquids and gases. It's designed to facilitate quick and effective cleaning and to minimise thermal losses.

Requirements: COLD, HT 10XC

View data sheet: www.armfield.co.uk/heat_transfer

ChE ME CE IP

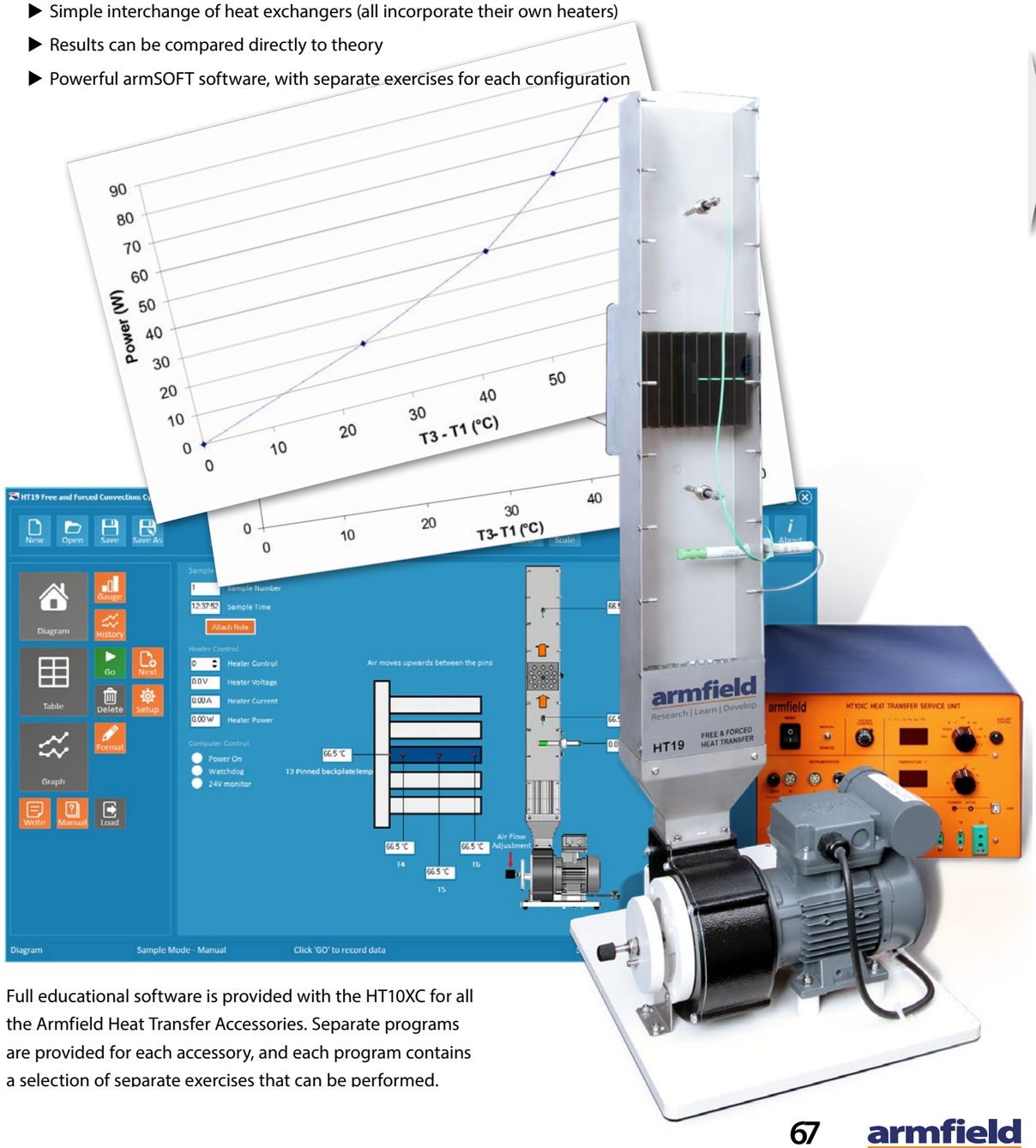
Scale

ChE Chemical Engineering
ME Mechanical Engineering
CE Civil Engineering
IP Industrial Processing

The HT19 is designed for use with the Armfield HT10XC Heat Transfer Teaching Equipment

Unique Features*

- Transparent duct allows visualisation of the whole process
- Experiments can be performed outside the duct to give totally free convection
- The heat exchangers can also be operated on the bench to investigate the effects of orientation (guards provide safety)
- Simple interchange of heat exchangers (all incorporate their own heaters)
- Results can be compared directly to theory
- Powerful armSOFT software, with separate exercises for each configuration



Full educational software is provided with the HT10XC for all the Armfield Heat Transfer Accessories. Separate programs are provided for each accessory, and each program contains a selection of separate exercises that can be performed.

armfield

Internal Combustion Engines

CM SERIES

Armfield's range of internal combustion engines encompasses automotive and aviation power units, each one mounted on a test bed and providing a complete engine learning system.

CM11-MkII / CM12 / CM14 all come with ArmSoft™ software, which can be used to run the engine from a PC. The software incorporates the full range of facilities as outlined in the ArmSoft™ software section.

CM20 has the armBUS control system integrated into the product (see armBUS section).

Requirements: 1Ph, EXTRACTOR, PC, HEARING PROTECTION, USB, COLD. Scale

Gasoline Engine - CM11-MKII

The Armfield CM11-MKII Gasoline Engine Apparatus is a self-contained engine test rig which has been designed to allow the study of the basic operating characteristics of a modern four-stroke 3-cylinder, 1.2 litre water cooled, spark ignition engine Automotive engine. Supplied as standard with an integrated eddy current dynamometer to produce engine performance curves and analysis

Available options include an engine indicator set which allows measurement of cylinder pressure and an LPG fuel system.

Engine Indicator set available as an option CM11-MK11-12

LPG Fuel System available as a option CM11-MK11-13

View data sheet: www.armfield.co.uk/cm11 ME IP

Requirements: 1Ph, EXTRACTOR, PC, HEARING PROTECTION, USB, COLD. Scale

Automotive Diesel Engine - CM12

The Armfield CM12 Diesel Engine Apparatus is a self-contained engine test rig which has been designed to allow the study of the basic operating characteristics of a modern four-cylinder, 1.9 litre water cooled, compression ignition engine Automotive engine. Supplied as standard with an integrated eddy current dynamometer to produce engine performance curves and analysis

Available option includes a engine indicator set which allows measurement of cylinder pressure.

Engine Indicator set available as an option CM12- 12

View data sheet: www.armfield.co.uk/cm12 ME IP

Requirements: 1Ph, EXTRACTOR, PC, HEARING PROTECTION, USB. Scale

Axial Flow Gas Turbine - CM14

The CM14 is a complete, aeronautical axial flow gas turbine engine with full instrumentation and sensors. Those sensors measure the gas temperature and pressure at different stages within the engine, together with the thrust generated and the fuel consumption. It features simple electric starting with no requirement for propane gas or compressed air.

The turbine itself can be bench mounted and incorporates a transparent safety guard for full visibility. The small size minimises the laboratory space required. The control box can be located in an adjacent room if required.

Axial Flow Gas Turbine (CM14) With Floor Stand Option - CM14-10

View data sheet: www.armfield.co.uk/cm14 ME IP

Requirements: 1Ph, EXTRACTOR, PC, HEARING PROTECTION, USB. Scale

Single Cylinder Combustion Engine - CM20 – armBUS integrated

The Armfield CM20 Single Cylinder Combustion Engine Apparatus is a self-contained engine test rig which has been designed to allow the study and comparison of the basic operating characteristics of modern spark ignition and compression ignition engines. The unit consists of a selection of optional engines which can be coupled to an eddy current dynamometer (supplied as standard) which acts as a brake.

Options available:

Petrol engine electrical start - CM20-10-1
Petrol engine indicator set - CM20-10-12
Diesel engine electrical start - CM20-20-1
Diesel engine electrical start sensor prepared - CM20-20-3
Diesel engine indicator set - CM20-20-12
Fuel level option - CM20-30
Pressure sensor amp - CM20-12-12

View data sheet: www.armfield.co.uk/cm20 ME IP

armfield

Refrigeration & Air conditioning

RA SERIES

The Armfield RA series is designed to clearly demonstrate the principles behind modern refrigeration and air conditioning systems.

The series includes four separate units; the RA1-MKII Vapour-Compression Refrigeration System, RA2 Air Conditioning System, RA3 Re-circulating Air Conditioning System and RA4 Air-Conditioning Training Unit.

Recirculating Air Conditioning Unit - RA3

- Understanding and using psychrometric charts, relative humidity and humidity ratios
- Sensible heating and cooling of air
- Humidification and dehumidification
- Understanding enthalpy
- Additional Instructional Capability with RA3
- Energy savings with recirculation
- Heat transfer across the evaporator

Requirements: 1Ph, PC, USB

Vapour-Compression Refrigeration Unit - RA1-MKII

The vapour-compression refrigeration system is the most common refrigeration system used today. RA1-MKII is a computer-controlled vapour-compression refrigeration unit with automatic recording of appropriate process variables using an integral USB interface device. This allows the student to gain a thorough understanding of the refrigeration process by changing the operation of different parts of the process and recording the response of the complete system.

Scale

View data sheet: www.armfield.co.uk/ra1

ChE ME CE IP

Requirements: 1Ph, PC, USB

Air Conditioning Unit - RA2

The Armfield RA2 Unit represents a model of an Air Conditioning system by demonstrating the effects of essential Air Conditioning processes: cooling, heating, humidifying and dehumidifying. The effect and relationships of the primary processes involved in air handling systems can be investigated. The RA2 Unit is designed so that the student can simulate different environments and perform measurements to allow psychrometric data analysis.

Scale

View data sheet: www.armfield.co.uk/ra2

ChE ME CE IP

Requirements: 1Ph, PC, USB

Recirculating Air Conditioning Unit - RA3

The Armfield RA3 Unit represents a model of a Recirculating Air Conditioning system by demonstrating the effects of essential Air Conditioning processes: cooling, heating, humidifying and dehumidifying. The effect and relationships of the primary processes involved in air handling systems can be investigated. The system additional features an enclosed climate control Chamber, Adjustable recirculation of air leaving the chamber back into the conditioning duct and pressure gauges and temperature sensors to allow the refrigerant temperature change across the condenser and evaporator to be established. The refrigerant flow rate is also measured using a variable area flow meter.

Scale

View data sheet: www.armfield.co.uk/ra3

ChE ME CE IP

Requirements: 1Ph

Air-Conditioning Training Unit - RA4

The RA4 is a standalone desktop refrigeration demonstrator based on a vapour compression refrigeration system (VCRS). The most common refrigeration system used today, this is where the refrigerant undergoes phase changes to absorb and reject heat in a controlled manner.

The RA4 Unit is designed so that the student can understand the fundamental components and operation of a refrigeration/air conditioning system. The system can be used as a demonstration, fault diagnosis and as a service training unit.

Scale

View data sheet: www.armfield.co.uk/ra4

ChE ME CE IP

ChE Chemical Engineering
ME Mechanical Engineering
CE Civil Engineering
IP Industrial Processing

armfield
Structural Engineering

ST SERIES

The Armfield ST series is designed to understand structural behaviour and by combining hardware and software, diagrams are displayed immediately behind the structure.

A pioneering new approach to the teaching of structural engineering. A fusion of innovative software, unique hardware and the authoritative textbook provide a firm foundation on the understanding of structural behaviour.

Unique features :

- Intuitive design providing great touch and feel
- Carbon fibre elements provide exaggerated response for enhanced visualisation
- Carbon fibre elements also provide negligible plastic deformation for long life and repeatability
- Fully integrated hardware and software display
- Includes eight standard projects including cantilevers, beams and portal frames
- Wide range of additional structures can be constructed from simple components
- Compare computer simulations with actual responses
- Sensor and instrumentation package
- Supplied with the textbook Understanding Structural Analysis by Dr David Brohn

Watch video or search ST10 at armfield.co.uk

UNDERSTANDING STRUCTURAL BEHAVIOUR TM

Applictions

ME	CE	IP
Mechanical Engineering	Civil Engineering	Industrial Processing

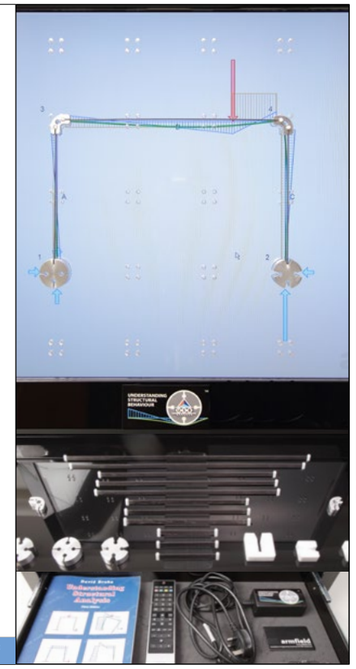
Requirements: 1Ph, PC, USB

Understanding Structural Behaviour ST10

ST10 includes:

- Eight standard projects including cantilevers, beams and portal frames
- Backboard matrix for building the physical structure model
- Set of elements, supports and joints for the above range of structures to be implemented (many others can also be implemented)
- 32" High definition display with HDMI interface
- Display and Visualisation software
- RISA 2D models
- Book "Understanding Structural Analysis" by Dr. David Brohn – Includes demo version of QSE Analysis software
- Storage facility for all components

Capabilities can be extended by the addition of the Instrumentation Package ST11



Scale

View data sheet: www.armfield.co.uk/st10 ME CE IP

Requirements: ST10, PC, 1Ph, USB

Instrumentation Package ST11

ST11 comprises: Deflection Sensor; Linear Actuator; Three Component Rigid Support Sensor; Two Component Pinned Support Sensor; Simple Support Sensor, Interface Unit plus power supply and interconnecting cables; Software for Control and Instrumentation functions is supplied with ST10.

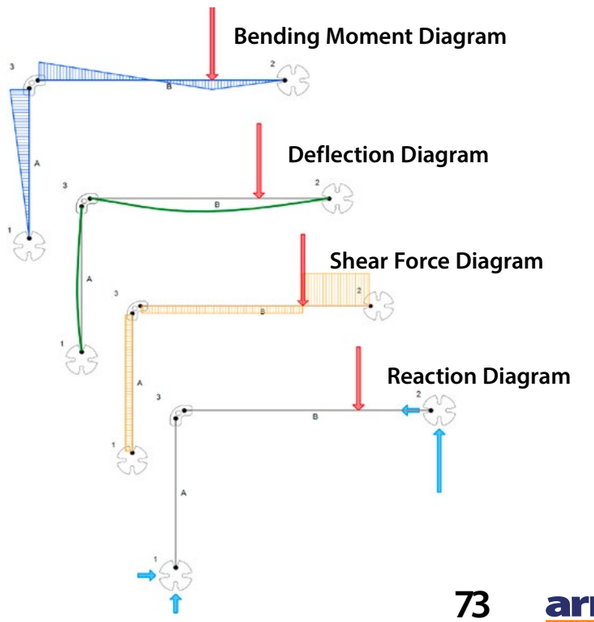
Note: Additional sensors and actuators can be added later.

Scale

View data sheet: www.armfield.co.uk/st10 ME CE IP

Functions of the software:

- Contains presentations to introduce the concepts of bending moment, shear, deflections and reactions and their associated graphical representation on the structure diagram
- When used in conjunction with the instrumentation hardware, the software controls the actuators and displays the outputs from the various sensors
- In this mode the displayed diagrams relate to the actual load applied by the actuator, rather than a simulated load
- Provides calibration for the sensors and screen



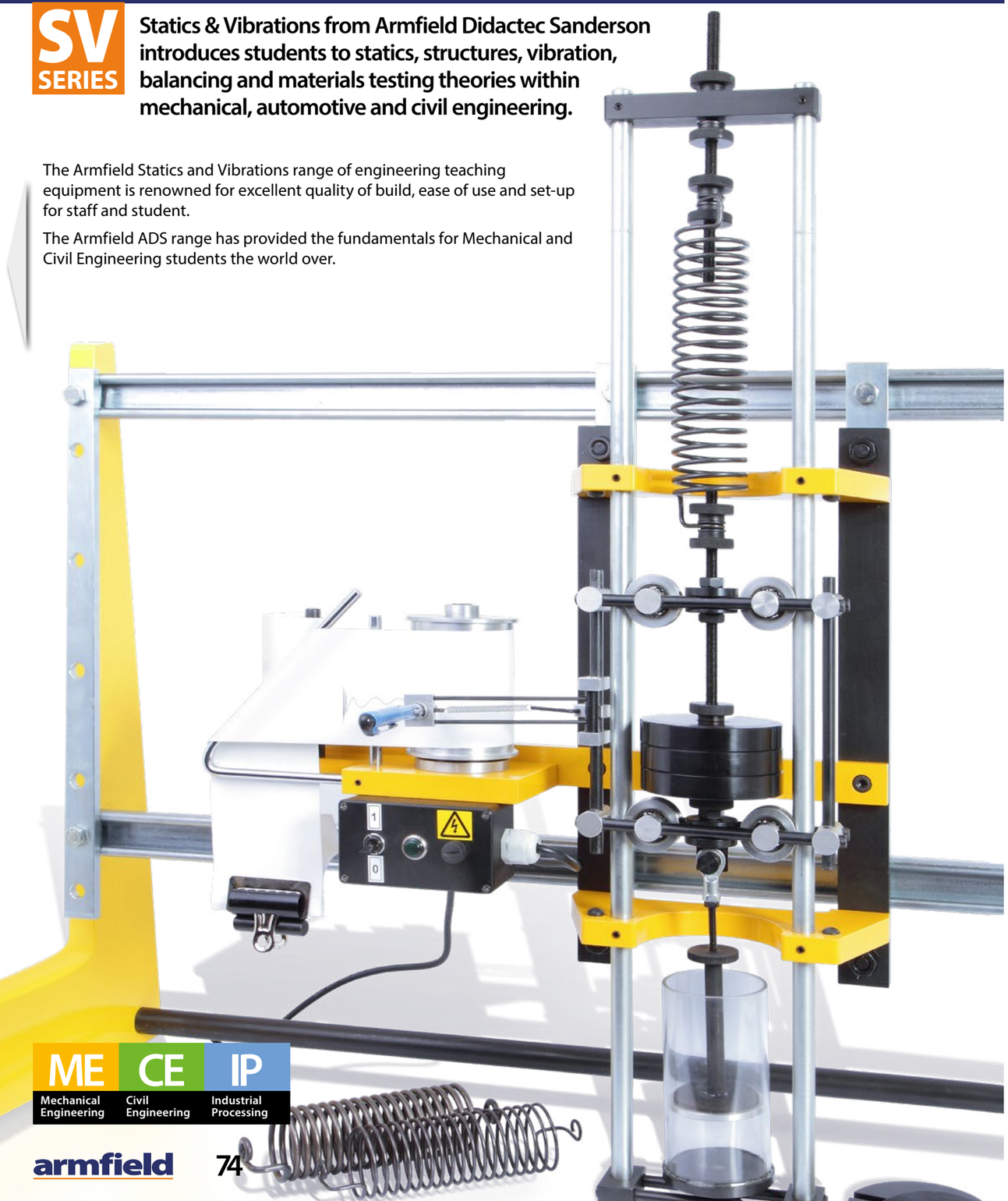
armfield
Statics & Vibrations

SV SERIES

Statics & Vibrations from Armfield Didactec Sanderson introduces students to statics, structures, vibration, balancing and materials testing theories within mechanical, automotive and civil engineering.

The Armfield Statics and Vibrations range of engineering teaching equipment is renowned for excellent quality of build, ease of use and set-up for staff and student.

The Armfield ADS range has provided the fundamentals for Mechanical and Civil Engineering students the world over.



ME Mechanical Engineering
CE Civil Engineering
IP Industrial Processing

Requirements

Weight Sets - SD-1.01/02/03

The Armfield weight sets are important accessories for many of our Statics & Vibrations units. These sets are essential tools for many mechanical and civil engineering experiments, and can increase the range of tests performed with many of the SV series equipment.

Scale

View data sheet: www.armfield.co.uk/sv ME CE IP

Requirements

Universal Bench Mounted Frame - SD-1.10

The Armfield universal bench mounted frame provides a very sensible alternative to wall mounting, particularly since many new buildings are predominantly glass, with very flimsy dividing walls.

The frame is designed to accommodate two items of equipment, allowing adequate space for students to work on each piece of equipment simultaneously.

Scale

View data sheet: www.armfield.co.uk/sv ME CE IP

Requirements

SD-1.02 x2

Friction Apparatus - SD-1.26

The friction apparatus is intended for use in either the classroom or laboratory and may be used for simple demonstrations to illustrate the force of friction.

This equipment can be wall mounted or quickly and easily mounted on the optional Universal Bench Mounted Frame - SD-1.10

Scale

View data sheet: www.armfield.co.uk/sv ME CE IP

Requirements

SD-1.02 x1

Unsymmetrical Cantilever Apparatus - SD-3.11

The unsymmetrical cantilever apparatus is intended to demonstrate the unsymmetrical bending of beams. Simple experiments may be carried out to determine the deflections Δu and Δv at the free end of cantilevers of various sections for varying angles of applied load from which the relationship between Δu/W and Δv/W may be determined graphically.

Shear Centre Attachment - SD-3.11C (Optional)

Scale

View data sheet: www.armfield.co.uk/sv ME CE IP

Warranty

Two year warranty

Torsion of Bars Apparatus - DT-8.00

This simple piece of apparatus has been designed for student laboratory exercises to investigate the elastic torsion characteristics of circular bars. The range of experiments includes:

- The verification of the elastic torsion equation
- The determination of the modulus of rigidity for different materials

Requirements

View data sheet: www.armfield.co.uk/sv ME CE IP

Scale

Strut Buckling Apparatus - DT-8.01

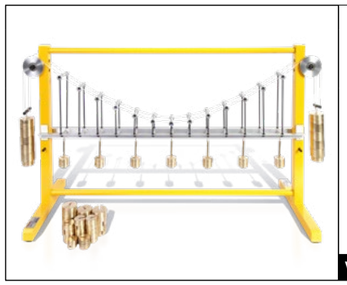
This apparatus enables the student to determine experimentally the buckling load for struts of varying slenderness ratios and end fixing conditions.

Varying lengths of struts can be subjected to direct axial loading and the critical load determined accurately.

Requirements

View data sheet: www.armfield.co.uk/sv ME CE IP

Scale



Suspended Beam Apparatus - DT-8.02

This apparatus is intended to represent a simple application of a suspended beam and may be used to determine experimentally the tension in the cables supporting a beam carrying a series of distributed loads.

A light alloy beam is supported on the rods attached at pivot points to cross members threaded on the supporting cables which pass over ball bearing pulleys.

- Supplied complete with masses

Requirements

View data sheet: www.armfield.co.uk/sv ME CE IP

Scale

Two Hinged Arch Beam Apparatus - DT-8.03

The apparatus enables the student to determine experimentally the horizontal component of the abutment thrust of a simple two hinged arch beam.

The beam is supported on ball bearing rollers attached to each end of the beam and the horizontal movement of the free end is indicated by a dial gauge so that the beam can be returned to its original unloaded span.

- Supplied complete with masses

Requirements

View data sheet: www.armfield.co.uk/sv ME CE IP

Scale

Applications

ME	CE	IP
Mechanical Engineering	Civil Engineering	Industrial Processing

Portal Frame Apparatus - DT-8.04

A simple piece of apparatus designed for use in conjunction with theoretical studies in the deflections of a simple rectangular portal frame subject to varying applied loads.

- Supplied complete with masses

Requirements

Scale

View data sheet: www.armfield.co.uk/sv ME CE IP

Deflection of Curved Bars Apparatus - DT-8.05

A small compact piece of apparatus designed to enable the student to determine experimentally the horizontal and vertical displacements at the free end of various thin curved bars when subject to single concentrated loads.

The specimen bars are attached to a rigid base by means of a simple clamp block which can be secured in predetermined positions to suit the specimen.

- Supplied complete with masses

Requirements

Scale

View data sheet: www.armfield.co.uk/sv ME CE IP

Bending Moment & Shearing Force Apparatus - DT-8.06

This apparatus has been designed for use in either the classroom or laboratory and may be used to show that in a beam subject to transverse loads, at any section of the beam:

- The shearing force is the algebraic sum of the transverse components of the forces to one side of the section
- The bending moment is the algebraic sum of the moments of the forces to one side of the section
- Supplied complete with masses

Requirements

Scale

View data sheet: www.armfield.co.uk/sv ME CE IP

Universal Strut Apparatus - SD-3.12

The Universal strut apparatus has been developed to enable students to carry out a series of tests to determine the crippling load for struts of varying slenderness ratios and end fixing conditions.

The apparatus has been designed to accommodate struts of suitable lengths within the range 400 to 800mm. The struts are rectangular in cross section, thus ensuring that the deflection occurs in a predetermined plane.

Round Specimen Kit - SD-3.12A (Optional)

View data sheet: www.armfield.co.uk/sv ME CE IP

Requirements

Scale

Beam Deflection Apparatus - SD-3.13

The beam deflection apparatus has been designed to enable students to carry out experiments on simply supported and cantilever beams in order to investigate the relationship between the deflections and the applied loads and the effect of variations in length and cross sectional dimensions on the beam deflection.

View data sheet: www.armfield.co.uk/sv ME CE IP

Requirements

SD-1.03 x2

Scale

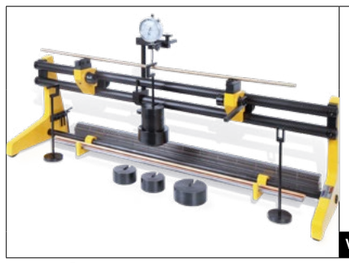
Thin Cylinder Apparatus - SD-3.50A

The thin cylinder apparatus permits the investigation of stresses and strains in a thin cylinder under internal pressure. The thin-walled alloy cylinder, supported by a cradle, is mounted on a base board together with the hydraulic hand pump for pressurising the system.

View data sheet: www.armfield.co.uk/sv ME CE IP

Requirements

Scale



Twist & Bend Testing Machine - SD-4.00

The SD-4.00 is a combined twist and bend testing machine for use both in pupil's laboratory exercises and in conjunction with theoretical work on twist and bending. Its size and weight make it easy to carry between the different classrooms.

View data sheet: www.armfield.co.uk/sv ME CE IP

Requirements

Scale

Applications

ME Mechanical Engineering

CE Civil Engineering

IP Industrial Processing

Requirements 1Ph

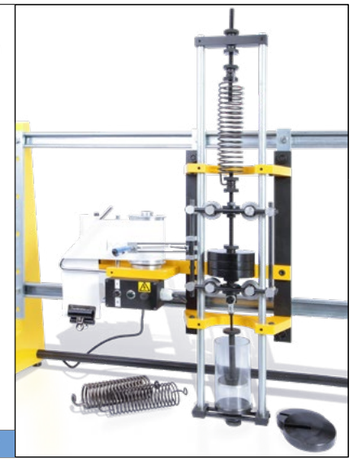
Simple Vibration Apparatus - SD-4.13

The simple vibration apparatus illustrated is intended for use in either the lecture room or the laboratory.

Demonstrations may be carried out to illustrate free and damped vibrations of a simple spring-mass system having one degree of freedom and the response of a second-order mechanical system to a step input.

Scale

View data sheet: www.armfield.co.uk/sv ME CE IP



Requirements 1Ph

Free & Forced Vibration Apparatus - SD-4.13A

The free and forced vibration apparatus has been developed to extend the range of demonstrations and experiments which may be carried out to include the free and forced vibrations of a single degree of freedom with viscous damping.

Simple adjustments can be made to the apparatus and the motion of the mass can be readily observed and recorded on the two pen recorders provided. The use of so called "Black Boxes" has been avoided, a feature welcomed by most teachers.

Scale

View data sheet: www.armfield.co.uk/sv ME CE IP

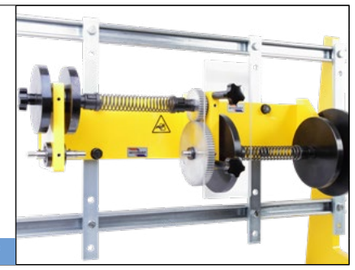
Requirements

Torsional Oscillations Apparatus - SD-4.14

The torsional oscillations apparatus is intended for use in either the classroom or the laboratory and may be used to illustrate and investigate the torsional oscillations of single rotor, multi-rotor and geared systems. The apparatus consists of a rigid frame carrying bearing cells, helical springs to simulate long flexible shafts and discs of varying mass moment of inertias. Suitable gears of various sizes are also provided. Shown mounted on the optional Universal Bench Mounted Frame - SD-1.10

Scale

View data sheet: www.armfield.co.uk/sv ME CE IP



Requirements 1Ph

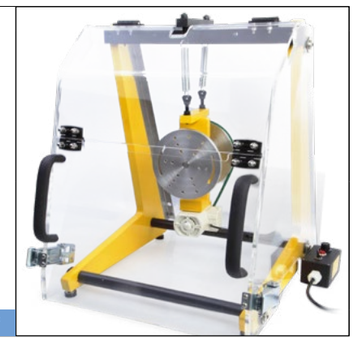
Simple Balancing Apparatus - SD-5.12

The simple balancing apparatus has been designed with courses in Mechanical Engineering in mind. It is intended for use in either the classroom or laboratory for simple demonstrations and experiments in the balancing of co-planar rotating systems.

The rotating system is basically a shaft mounted on bearings, supported in a rigid frame and driven by a small electric motor attached to the frame. A disc to which masses may be attached is rigidly secured to the shaft.

Scale

View data sheet: www.armfield.co.uk/sv ME CE IP



armfield

Chemical Engineering

CE SERIES

Armfield's CE and UOP ranges of products, offer the most comprehensive, diverse and technically current group of products of any manufacturer

The CE range brings the many principles of chemical engineering to the modern educational laboratory.

ChE Chemical Engineering | IP Industrial Processing

Computer Controlled Chemical Reactors Training Equipment - CEXC

Requirements: PC, USB, COLD, 1Ph

Computer Controlled Chemical Reactors Training Equipment - CEXC

The Armfield CEXC Computer Controlled Chemical Reactors Teaching Equipment demonstrates the characteristics of the important types of chemical reactors.

The self-contained benchtop service unit is designed to provide services for up to five different chemical reactors. Continuous stirred tank reactor, Tubular reactor with plug, Transparent batch reactor, Plug flow reactor and laminar flow.

Scale

View data sheet: www.armfield.co.uk/cexc ChE IP

Requirements: CEXC

Continuous Stirred Tank Reactor - CEM-MkII

The continuous stirred tank reactor is used widely and is particularly suitable for liquid phase reactions. It is particularly used in the organic chemicals industry. Advantages include consistent product quality, straight forward automatic control and low manpower requirements.

The Armfield CEM MkII Continuous Stirred Tank Reactor is specially designed to allow detailed study of this important process. It is one of five reactor types which are interchangeable on the Reactor Service Unit (CEXC).

Reactions are monitored by conductivity probe as the conductivity of the solution changes with conversion of the reactants to product and by temperature.

Chilled Water Circulating Unit - CW-17 (Optional)

Scale

View data sheet: www.armfield.co.uk/cexc ChE IP

Requirements: CEXC

Tubular Reactor - CET-MkII

Tubular reactors are often used when continuous operation is required but without back-mixing of products and reactants.

The Armfield CET MkII Tubular Reactor is specially designed to allow detailed study of this important process. It is one of five reactor types which are interchangeable on the Reactor Service Unit (CEXC).

Reactions are monitored by conductivity probe as the conductivity of the solution changes with conversion of the reactants to product. This means that the inaccurate and inconvenient process of titration, which was formally used to monitor the reaction progress, is no longer necessary.

Scale

View data sheet: www.armfield.co.uk/cexc ChE IP

Requirements: CEXC

Transparent Batch Reactor - CEB-MkII

Batch reactors are used widely in industry at all scales. Batch reactors are tanks, commonly provided with agitation and a method of heat transfer (usually by coils or external jacket). This type of reactor is primarily employed for relatively slow reactions of several hours' duration, since the downtime for filling and emptying large equipment can be significant. Agitation is used to maintain homogeneity and to improve heat transfer.

The Armfield CEB MkIII Transparent Batch Reactor is specially designed to allow detailed study of this important process. It is one of five reactors types which are interchangeable on the Computer Controlled Reactor Service Unit (CEXC).

Reactions are monitored by conductivity probe as the conductivity of the solution changes with conversion of the reactants to product and visually due to the use of indicators.

Scale

View data sheet: www.armfield.co.uk/cexc ChE IP

Plug Flow Reactor - CEY

The Armfield CEY-Plug Flow Reactor is an example of an ideal tubular reactor.

The CEY Plug Flow Reactor demonstrates step and pulse changes for plug flow characterisation and steady-state conversion for a second order reaction. It is a tubular packed column reactor made of clear acrylic and mounted on a steel frame. A static premixer at the bottom of the column provides premixing of the reagents entering the reactor and improves the flow distribution. It is one of five reactor types which are interchangeable on the Computer Controlled Reactor Service Unit (CEXC).

Reactions are monitored by conductivity probe as the conductivity of the solution changes with conversion of the reactants to product. In addition, all the experiments are followed visually by means of the reactor transparency and the use of colour indicators in all the experiments. *Shown with CEXC*

View data sheet: www.armfield.co.uk/cexc ChE IP

Requirements: CEXC

Scale

Laminar Flow Reactor - CEZ

The Armfield CEZ-Laminar Flow Reactor is an example of an ideal tubular reactor.

The CEZ Laminar Flow Reactor (shown with CEXC) demonstrates step and pulse changes for plug flow characterisation and steady-state conversion for a second order reaction. The Armfield Laminar Flow Reactor is a tubular reactor made of clear acrylic and mounted on a floor standing steel frame, with two diffusers packed with glass beads located at the ends. A static premixer at the bottom of the column provides premixing of the reagents entering the reactor and improves the flow distribution. It is one of five reactor types which are interchangeable on the Computer Controlled Reactor Service Unit (CEXC).

Reactions are monitored by conductivity probe as the conductivity of the solution changes with conversion of the reactants to product. In addition, all the experiments are followed visually by means of the reactor transparency and the use of colour indicators in all the experiments. Shown with CEXC

View data sheet: www.armfield.co.uk/cexc ChE IP

Requirements: CEXC

Scale

Stirred Tank Reactors in Series - CEP-MkII

The Armfield Stirred Tank Reactors in Series unit is designed to follow the dynamics of the perfectly mixed multi-stage process. Dynamic behaviour can be studied as can multi-stage chemical reaction.

View data sheet: www.armfield.co.uk/cep ChE IP

Requirements: PC, USB, 1Ph

Scale

Catalytic Reactors - CEU

The Armfield Catalytic Reactors unit (CEU) utilises the sugar inversion reaction (Sucrose -> Glucose + Fructose) to study the performance of packed-bed chemical and biological catalytic reactors. A colorimetric assay is used to determine the degree of conversion using an optical sensor. Assays may be automated using optional flow injection analysis.

Flow Injection Analysis - CEU-3 (Accessory)
Third Reactor Column - CEU-5

View data sheet: www.armfield.co.uk/ceu ChE IP

Requirements: PC, USB, 1Ph

Scale

Fixed and Fluidised Bed Apparatus - CEL-MkII

The unit has three columns, one for use with water and two for use with air. The separate air and water columns enable the difference between 'aggregative' and 'particulate' fluidized bed characteristics to be demonstrated. The two air columns enable the effect of different packing material sizes to be demonstrated without having to remove, empty and repack a column.

View data sheet: www.armfield.co.uk/cel ChE IP

Requirements: PC, USB, 1Ph, COMP. AIR

Scale

Fluid Mixing Studies - CEK-MkII

Mixing of liquid / liquid or solid / liquid systems is a complex operation to analyse and subject to many variables. The choice of mixer for a particular application depends on the degree of bulk movement or shear mixing required by the process. This liquid mixing apparatus has been developed to demonstrate the factors affecting mixing using visualisation and measurement techniques as appropriate.

View data sheet: www.armfield.co.uk/cek ChE IP

Requirements: PC, USB, 1Ph, HOT

Scale

Solids Handling Study Bench - CEN-MkII

The flow and handling characteristics of granular materials are relevant to many process industries, particularly in the handling of powders, pellets, crystals and aggregates. The CEN-MKII introduces students to the behaviour of granular materials. The various teaching exercises are split between three units that can be purchased separately or as a complete set allowing only relevant equipment to be purchased. The following equipment is available: CEN-MKII-11 Solids Handling, CEN-MKII-12 Powder Handling, CEN-MKII-13 Vibratory shaker and sieves.

View data sheet: www.armfield.co.uk/cen ChE IP

Requirements: COMP. AIR, 1Ph, SAND

Scale

Corrosion Studies Kit - CEQ

The Armfield CEQ provides an introduction to corrosion, a significant factor in determining durability and safety of industrial processes. The CEQ allows students to recognise and make provisions for potentially corrosive situations. The equipment allows for the simultaneous study of up to eight corrosion cells. A pH meter and electrode are supplied to ensure the correct strength of initial test solutions. For the study of electro-chemical corrosion effects, a low voltage supply is included, together with all necessary electrical connections.

View data sheet: www.armfield.co.uk/ceq ChE IP

Requirements: 1Ph

Scale

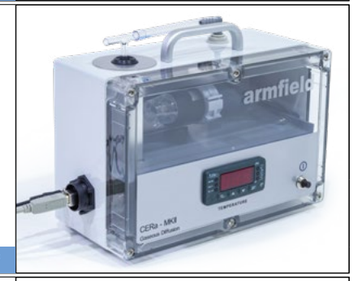
Mass Transfer and Diffusion Coefficients - CERa-MkII & CERb

Two separate items of laboratory equipment have been designed to enable measurement of molecular diffusitives, to familiarise students with the basic notions of mass transfer theory. The Gaseous Diffusivity Apparatus (CERa-MkII, pictured) involves diffusion with bulk flow, while the Liquid Diffusivity Apparatus (CERb) relates to equimolar counter-diffusion.

View data sheet: www.armfield.co.uk/ceramkii ChE IP

Requirements: PC, USB, 1Ph

Scale



Wetted Wall Gas Absorption Column - CES

Wetted wall columns may be used to determine gas/liquid mass transfer coefficients, essential when calculating the design of absorption towers. Such coefficients form the basis of correlations used to develop packed towers.

CES examines the absorption of oxygen from air into deoxygenated water (prepared by nitrogen sparging). This is an example of liquid-film controlled absorption. The liquid-film mass transfer coefficient can be determined at various mass flow rates of water.

View data sheet: www.armfield.co.uk/ces ChE IP

Requirements: 1Ph

Scale

armfield
Unit Operations

UOP SERIES

The Armfield Unit operations range provides a series of products designed to allow in depth teaching and investigation into the individual basic steps in a process relating to Chemical engineering and associated fields.

Each product can be considered to have a single function in a potentially multiple step process, involving a physical change or chemical transformation such as separation, crystallization, evaporation, filtration, distillation, extraction, absorption and drying.

UOP30: 3-Phase Horizontal Separator

The Armfield 3-Phase Horizontal Separator is a small-scale unit capable of demonstrating the principles and operation of gravity separation and the effect of viscosity, flow characteristics and density difference on separation.

Applications

ChE Chemical Engineering

IP Industrial Processing

Requirements: 1Ph, PC, USB, COLD

Scale

Solid-Liquid Extraction Unit - UOP4-MkII

The Armfield UOP4 MkII is designed to demonstrate a simplified version of the moving-bed leaching process used by many industrial solid/liquid extraction systems. The process used is a continuous multi-stage process, which gives counter current flow of the solvent and the solid phase. A batch extraction vessel is also incorporated to allow demonstration of fixed-bed leaching with either open or closed loop circulation of the solvent. The effects of temperature, throughput rate and the effect multiple stages can all be investigated.

AC1 - Air compressor (Optional)

View data sheet: www.armfield.co.uk/uop4 ChE IP

Requirements: 1Ph, PC, USB, COLD

Scale

Liquid-Liquid Extraction Unit - UOP5-MkII

This unit provides an introduction to the operation of an industrial type of liquid/liquid extraction system. A vertical column is used to contact two essentially immiscible liquids flowing counter-currently through Raschig ring packing. Either liquid can be selected to be the continuous phase.

Traditionally this has been difficult to demonstrate in the laboratory, requiring the use of highly toxic, expensive and / or environmentally damaging solvents. The Armfield UOP5-MkII introduces a system using Kerosene (Paraffin) which is simple, safe and inexpensive.

Option:

AC1 (Air compressor)

View data sheet: www.armfield.co.uk/uop5 ChE IP

Requirements: 1Ph, PC, USB, COLD, CO_2

Scale

Gas Absorption Column - UOP7-MkII

A pilot-scale apparatus enabling familiarity with the characteristics of packed tower hydrodynamics and absorption processes. The Armfield gas absorption column has been designed to demonstrate the process of gas absorption, desorption and stripping. The Absorption Column is scaled so that teaching exercises can be completed in a typical laboratory class period, while at the same time capable of demonstrating full-scale plant behaviour. The system is supplied as standard with electronic control of fluid flow, electronic measurement of Co2 concentration and full computer control and data logging.

View data sheet: www.armfield.co.uk/uop7 ChE IP

Requirements: 1Ph, PC, USB, OIL, COLD

Scale

3-Phase Horizontal Separator - UOP30

The Armfield 3-Phase Horizontal Separator is a small-scale unit capable of demonstrating the principles and operation of gravity separation and the effect of viscosity, flow characteristics and density difference on separation. The UOP30 comes with two horizontal separator configurations interface/weir and bucket/weir making the UOP30 a versatile teaching unit.

The separation of two immiscible liquids and a gas using density difference is one of the most important process operations in the oil and gas industry. Examples include separation of produced water and condensate from gas and the separation of gas and produced water from crude oil.

View data sheet: www.armfield.co.uk/uop30 ChE IP

Rising Film Evaporator - FT22 (Data Logging Included)

A floor-standing unit using the steam-heated, climbing film principle to concentrate small quantities of liquid foods either continuously or in batches. This unit has an integrated data logger supplied as standard. The important process parameters can be varied and monitored

The rising film evaporator consists of a vertical tube within a shell. Steam in the shell increases the temperature of product entering the tube at the base. As product boils, vapour rises up the tube, carrying a film of concentrated liquor up the inside walls of the tube. At the top of the tube the vapour is separated from the liquor in a cyclone separator and the vapour is then condensed.

Requirements: 1Ph, PC, USB

Scale

View data sheet: www.armfield.co.uk/ft22 ChE IP

Modular Evaporator Series - UOP20X (STM or PHW)

Maximum flexibility of choice and specification results from the modular approach, which offers a wide number of configurations. The service unit is capable of housing one or two columns with rising or falling film evaporation and controlled recirculation in either position. High vacuum capability enables low temperature evaporation. Integral pressurised hot water heating or external steam supply options are also available.

Full computer compatibility is provided and educational software is included detailing the equipment, evaporation theory, logging and analysis of results, questions and answers and a workbook facility.

If it is required to operate the system from an external steam supply, Armfield can provide a laboratory steam generator (UOP10) with a heat output of 30KW.

Requirements: 1Ph, PC, USB, COLD, SAFE VENTING

Rising film evaporator column (1st effect, 1st position) **- UOP22-11**
Rising film evaporator column (2nd effect, 2nd position) **- UOP22-22**
Falling film evaporator column (1st effect, 1st position) **- UOP23-11**
Falling film evaporator column (2nd effect, 2nd position) **- UOP23-22**
Falling film evaporator column (1st effect, 2nd position) **- UOP23-12**

Scale

View data sheet: www.armfield.co.uk/uop20x ChE IP

Computer Controlled Tray Dryer - UOP8-MKII

The most commonly used industrial method of drying solids in bulk consists of passing a hot air stream over fixed trays of wet material. This small pilot-scale tray dryer uses this method and is designed for laboratory training programmes. Operating conditions may be varied in a way that provides data demonstrating both theoretical and practical aspects of industrial drying practice. This equipment is applicable to the unit operations laboratory and also to food technology education and research.

Requirements: 1Ph, PC, USB

Scale

View data sheet: www.armfield.co.uk/uop8 ChE IP

Spray Dryer - FT30-MKIII

The FT30 MKIII is a simple and effective laboratory scale spray dryer for product research and development. The spray dryer is designed to enable initial product trials and evaluation to be carried out quickly and efficiently.

The unit is supplied with a complete set of glassware comprising of main drying chamber, cyclone, sample collection and waste collection bottles, clamps, seals and all necessary tubing.

The chemically resistant housing includes the blower, heater and the controls for inlet temperature and pump speed. The drying air volume is fixed at 70m3/hr.

AC1 - Air compressor (Optional)

Requirements: 1Ph, COMP. AIR

Scale

View data sheet: www.armfield.co.uk/ft30 ChE IP

Fluidised Bed Dryer FT31

A range of materials from fine powders to food particulates can be used on this versatile laboratory-scale unit.

- High rates of heat and mass transfer
- Less than 15 minutes drying time
- Digital readout display

Requirements: 1Ph

Scale

View data sheet: www.armfield.co.uk/ft31 ChE IP

Distillation columns - UOP3CC & UOP3BM

Two laboratory-scale distillation columns enabling safe operation of a real industrial process. A continuous distillation column, which also performs batch experiments, can be controlled manually or externally by a PC. Individual loops can be controlled using an industrial PLC or a PID controller.

A batch-only version is suitable for teaching the fundamentals of distillation. Both versions incorporate flameproof devices and intrinsically safe circuits plus feature plate and packed columns together with the display of temperatures on each of the eight sieve plates in the column.

Requirements: 1Ph, PC, USB, COLD, SAFE VENTING

Scale

View data sheet: www.armfield.co.uk/uop3 ChE IP

Basic Water Cooling Tower - UOP6-MkII

The Armfield UOP6-MKII Basic Water-Cooling Tower has been specifically designed to give students an appreciation of the construction, design and operational characteristics of a modern forced draught evaporative cooling system. The unit is also an excellent example of an open system through which two streams of fluid (water and air) flow in counter-current directions with heat and mass transfer from one stream to the other. The system is supplied as standard 1/3 height and 2/3 height packing in addition to full height packing for comparison.

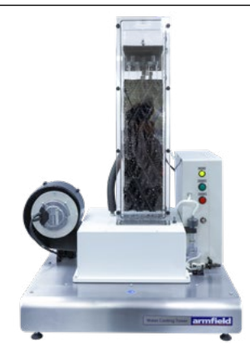
The tower is fully instrumented with electronic sensors and is operated and controlled via a USB port on a PC

UOP6-MKII-23 Packing characteristics accessory (Optional)

Requirements: 1Ph, PC, USB

Scale

View data sheet: www.armfield.co.uk/uop6 ChE IP



Filtration Unit - UOP12

The Armfield filtration unit demonstrates the principles of batch filtration using a fully functional plate and frame filter system. A continuous, tangential flow microfiltration unit using a hollow fibre filtration cartridge is also available as an option. Both types of filter are widely used in the commercial world.

Tangential Flow Filter Accessory - UOP12-10

Requirements: 3Ph, COLD, PC, COMP. AIR, USB

Scale

View data sheet: www.armfield.co.uk/uop12 — ChE IP

Crystallisation Unit - UOP14-MKII

Crystallisation is a valuable process in Chemical Engineering where the separation of one or more of the components from a liquid mixture is required. The Armfield UOP14-MkII demonstrates this process in the laboratory so that students may gain a thorough understanding of this industrial technique. The UOP14-MkII system demonstrates an industrially important type of crystallisation, namely solution cooling crystallisation.

Continuous Feed Accessory - UOP14-11
Buchner Filtration Accessory - UOP14-12

Requirements: 1Ph, PC, USB, COLD

Scale

View data sheet: www.armfield.co.uk/uop14 — ChE IP

Fixed Bed Adsorption Unit - UOP15

UOP15 demonstrates the adsorption of a solute, carbon dioxide, from a binary gas mixture onto the surface of a solid adsorbent, activated carbon. The adsorption and desorption/regeneration processes take place in a fixed bed adsorption column.

Requirements: 1Ph, CO_2, PC, HE, USB

Scale

View data sheet: www.armfield.co.uk/uop15 — ChE IP

Laboratory Steam Generator - UOP10

The UOP10 is an advanced boiler, providing a constant, steady supply of steam. The compact unit requires only connection to water and electrical supply for operation.

- Steam output at 100oc: 55kg/hr
- Heat output: 36Kw
- Maximum operating pressure: 10 bar

Blow Down Separator - UOP10-10

Requirements: 3Ph, PC, USB, COLD

Scale

View data sheet: www.armfield.co.uk/uop10 — ChE IP

Applications

ChE — Chemical Engineering
IP — Industrial Processing

Biochemical Engineering

BE SERIES

Biochemical Engineering is currently a growth area, attracting worldwide interest. Although many of the techniques and operations are common with Chemical Engineering, there are some important differences.

The Armfield BE series has four core products:
The BE1, BE2, BE3 and BE4, which together with CEU Catalytic Reactors from the CE series, give students an introduction and understanding of important Biochemical Engineering principles.

Batch Enzyme Reactor - BE1

A batch enzyme reaction system that utilises the industrially important glucose isomerisation reaction, (converting glucose to fructose) catalysed by glucose isomerase.

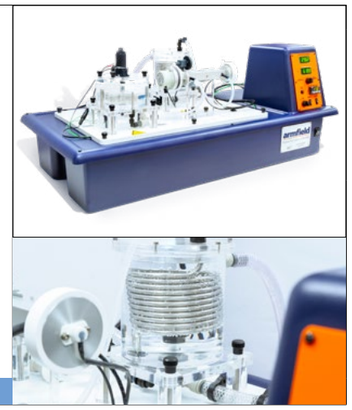
The purpose of the unit is to demonstrate batch enzyme kinetics and enzyme characteristics. The reaction takes place inside a stirred vessel where the stirrer itself is a porous basket inside which the enzyme is immobilised.

A polarimeter device, which is integral to the unit, monitors the glucose and fructose concentrations with time.

Requirements: 1Ph, PC, USB

Scale

View data sheet: www.armfield.co.uk/be1 — ChE IP



Chromatography unit - BE2

BE2 aims to demonstrate the principles and practices of chromatography - an important operation for both small- scale analysis and large-scale production of biologics. BE2 features two chromatography columns of variable bed height, which are fed by a peristaltic pump. An injection point enables samples to be introduced onto the column.

The unit has an on-line UV sensor for measuring protein concentration as it exits the column. BE2 is also equipped with a timer-controlled fraction collector. Size exclusion chromatography is the primary separation technique used for the demonstrations. Engineering principles, such as the effect of feed flow rate and bed height on process performance can be investigated.

Filtration / Degassing ASSEMBLY - BE2-1

Requirements: 1Ph, PC, USB

Scale

View data sheet: www.armfield.co.uk/be2 — ChE IP

Anaerobic Column Reactor - BE3

A self-contained, floor-standing anaerobic column reactor, 9l volume. Configurable as a fluidised bed reactor and an expanded granular sludge bed reactor (EGSB). Split heated column with central collar for instrumentation, dosing and liquid sampling. Recycle pump capable of rates from 0-15 l/min. Electronic measurement of recycle rate.

- Fluidised bed
- Expanded granular sludge bed reactor (EGSB)
- Measures reactor temperature, jacket temperature and vessel pH
- Programmable logic controller (PLC) provides temperature control, pH control and gas collection (rate and totalisation) calculations
- Jacket heating system with pump and hot water vessel. Temperature is PID controlled room temperature to 55°C
- Automated volumetric gas collection system measures, which adds less than 10 mbar back pressure to the reactor
- Complete with automated pH dosing system to maintain the vessel pH within a predetermined range (user programmable)
- User calibration of pH and gas collection system
- Feed flow rates from 0.06-4.8 l/hr (using interchangeable peristaltic hoses)
- Gas sample point
- Data logger and software as standard (requires PC, not supplied)

Requirements: 1Ph, PC, USB, COLD, EXTRACTOR

Scale

View data sheet: www.armfield.co.uk/be3 ChE IP

BE3 Anaerobic Column Reactor:

- Fluidised bed
- Expanded granular sludge bed reactor (EGSB)
- A self-contained, floor-standing anaerobic column reactor, 9l volume
- Configurable as a fluidised bed reactor and an expanded granular sludge bed reactor (EGSB)
- Split heated column with central collar for instrumentation, dosing and liquid sampling
- Recycle pump capable of rates from 0-15 l/min
- Electronic measurement of recycle rate

Applications

ChE Chemical Engineering

IP Industrial Processing

Requirements: 1Ph, PC, USB, COLD, EXTRACTOR

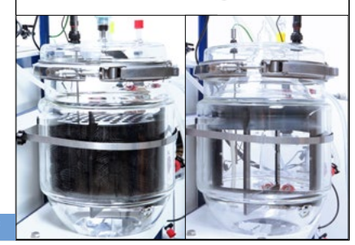
Scale

Anaerobic Tank Reactor - BE4

A self-contained, floor-standing anaerobic tank reactor, volume 20 litres, Stirrer, motor and baffles are removable for non-stirred configurations.

- Continuous stirred tank reactor (CSTR)
- Packed bed reactor (PBR)
- Upflow anaerobic sludge blanket reactor (UASB)
- Measures reactor temperature, jacket temperature and vessel pH
- Programmable logic controller (PLC) provides temperature control, pH control and gas collection (rate and totalisation) calculations
- Jacket heating system with pump and hot water vessel. Temperature is PID controlled room temperature to 55°C
- Automated volumetric gas collection system measures, which adds less than 10 mbar back pressure to the reactor
- Complete with automated pH dosing system to maintain the vessel pH within a predetermined range (user programmable)
- User calibration of pH and gas collection system
- Feed flow rates from 0.06-4.8 l/hr (using interchangeable peristaltic hoses)
- Gas sample point
- Data logger and software as standard (requires PC, not supplied)

View data sheet: www.armfield.co.uk/be4 ChE IP



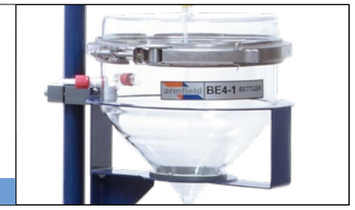
Requirements: BE4

Scale

Settler Reactor BE4-1 (Optional)

An optional settler (BE4-1) is also available for the Anaerobic Tank Reactor BE4. Its function is to collect solid particles of biomass at the exit from the reactor for return to the reactor in BE4. This biomass would otherwise be lost to the system.

View data sheet: www.armfield.co.uk/be4 ChE IP



BE4 Anaerobic Tank Reactor:

- Continuous stirred tank reactor (CSTR)
- Packed bed reactor (PBR)
- Upflow anaerobic sludge blanket reactor (UASB)
- A self-contained, floor-standing anaerobic tank reactor, volume 20 litres
- Stirrer, motor and baffles are removable for non-stirred configurations
- Variable depth liquid sampling point

armfield

Process Control Technology

PCT SERIES

A range of process teaching equipment is available to demonstrate relevant measurement and control experiments using real engineering equipment.

The Armfield range is designed on a building-block approach, which ensures that experimental set-ups can be assembled economically to meet individual course requirements.

Each practical work study system consists of a benchtop process demonstration unit and a control console, which contains the power supplies and interfacing for all measurement and actuation signals. Industrial controllers are available as accessories to further develop the practical instruction courses possible.

Additionally, the Essentials of Process Control (EPC) range of products takes students through the fundamentals and principles of process control, and progresses to give them a thorough grounding in the control of physical processes. Four independent process units demonstrate level, flow, temperature and pressure as the controlled variable.

Multi-Function Process Control Teaching System - PCT40

Requirements: PCT 40, PCT 23, UOP 3, 1Ph, PC, USB

Scale

Industrial PLC Unit - PCT19BR

The Armfield PCT 19BR Industrial PLC Unit employs the widely used Allen Bradley SLCSOO, together with suitable software and hardware connections to enable multi-channel compatibility with selected instructional equipment from the Armfield range.

The unit accepts up to six analogue and eight digital input signals and provides two analogue and eight digital output signals for use in configuring a wide variety of control loops for study and demonstration.

View data sheet: www.armfield.co.uk/pct19 ChE ME IP

Requirements: PCT 40, PCT 23, UOP 3, 1Ph, PC, USB

Scale

Industrial PID Controller - PCT20H

The unit consists of a Honeywell UDC3300 PID controller mounted in a standard console along with connectors for inputs and outputs to selected instructional equipment from the Armfield range. In addition to the analogue input/output, relay and alarm sockets are provided for a digital output control action.

View data sheet: www.armfield.co.uk/pct20h ChE ME IP

Requirements: PC, USB, 1Ph, COLD

Scale

Process Plant Trainer - PCT23-MkII

The Armfield Process Plant Trainer can be used to demonstrate a complete range of process control methods and strategies. Manual control, single feedback loops, through to sophisticated cascade loops and distributed supervisory control of the whole process by a remotely located computer can be demonstrated.

The system is a miniature replication of a true production process. The student is presented with real process control problems, with realistic dynamic behaviour and instabilities.

View data sheet: www.armfield.co.uk/pct23mkii ChE ME IP

Requirements: PC, USB, 1Ph, COLD

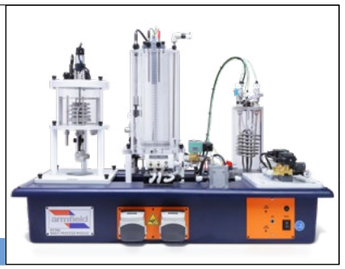
Scale

Multi-Function Process Control Teaching System - PCT40

The Armfield PCT40 system is designed for use in teaching a wide range of process control methods. The PCT40 basic unit is used under computer control to demonstrate a variety of process control loops. Processes such as level control, temperature control, flow control and pressure control can all be investigated, as can manual, on/off, proportional and PID control. The software included with the unit allows the student to change the control parameters and analyse the results from different configurations.

More advanced aspects of control can be addressed by adding optional extras to the basic system.

View data sheet: www.armfield.co.uk/pct40 ChE ME IP



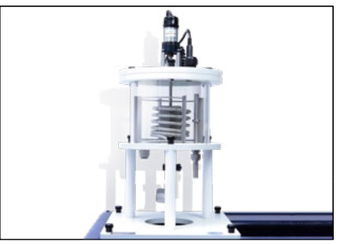
Requirements: PCT 40

Scale

Process Vessel Accessory - PCT41

The PCT41 expands on the capabilities of the PCT40 with a wider range of control loops and strategies, including Remote Set Points, dual loops and Fluid Property Control (using Conductivity as a representative example). All these loops are under software control. It includes a stirrer with electric motor, as well as a second heating coil. It includes provision for the optional pH probe accessory PCT42.

View data sheet: www.armfield.co.uk/pct40 ChE ME IP



Requirements: PCT 40, PCT 41

Scale

pH Sensor Accessory- PCT42

The PCT41 includes a conductivity probe as part of the basic supply. This conductivity probe can be used to demonstrate fluid property control systems, without the maintenance problems which can be experienced with pH probes. However, as pH control is probably the most common industrial application of this type of control system, users may wish to implement true pH control loops. This can easily be implemented by adding the PCT42 pH sensor accessory to the combined PCT40 + PCT41 system.

View data sheet: www.armfield.co.uk/pct40 ChE ME IP

Electronic Control Console - PCT43

The PCT43 is an electronic control console that can be used to control the PCT40 (+PCT41/42) instead of a computer. It includes controls for the pumps, valves and heater, plus a display for the sensors. It incorporates a commercial PID controller, complete with RS232 interface. Other facilities include 4-20mA interfaces and selector switches to enable many of the different configurations to be implemented without using external jumper connections.

Requirements: PCT 40, 1Ph, PCT 41

View data sheet: www.armfield.co.uk/pct40

ChE ME IP

Scale

Pneumatic Valve Module Accessory - PCT44

The PCT44 is a pneumatic control valve, plus associated components, for use with the PCT40/41 system. Retaining the flexible concept of the whole range, it can be plumbed into many of the flow control loops, and provides a good illustration of pneumatic valve technology.

AC1 - Air compressor (Optional)

Requirements: PCT 40, COMP. AIR

View data sheet: www.armfield.co.uk/pct40

ChE ME IP

Scale

EPC Level Control - PCT50

The Essentials of Process Control (EPC) range of products takes students through the fundamentals and principles of process control and progresses to give them a thorough grounding in the control of physical processes.

PCT50 is a highly visible and easy to understand water level control process. It comprises two clear acrylic tanks; a process tank mounted above a sump tank. Water is pumped up to the process tank and drains back to the sump tank via two valves, one manually variable and the other switched by software.

Requirements: PC, USB, 1Ph, COLD

View data sheet: www.armfield.co.uk/pct50

ChE ME IP

Scale

EPC Flow Control - PCT51

PCT51 is a visible and easy to understand water flow control process. Water stored in the sump tank is pumped through a parallel pipe arrangement mounted on the lid of the tank and returns to the tank via two outlets, a software switched divert valve prior to the flow meter and a manually operated variable valve after the flow meter.

Requirements: PC, USB, 1Ph, COLD

View data sheet: www.armfield.co.uk/pct50

ChE ME IP

Scale

EPC Temperature Control - PCT52

The PCT52 is a visible and easy to understand temperature control process. A fan blows air over a heater with radial fins and through a vertical clear acrylic duct. Sensors measure the surface temperature of the heater and the air temperature in the duct.

Requirements: PC, USB, 1Ph

View data sheet: www.armfield.co.uk/pct50

ChE ME IP

Scale

EPC Pressure Control - PCT53

The PCT53 is a highly visible and easy to understand pressure control process, which uses pumped water to generate air pressure in a closed tank. It comprises two clear acrylic vessels, an upper process vessel mounted above an open sump tank.

Requirements: PC, USB, 1Ph, COLD

View data sheet: www.armfield.co.uk/pct50

ChE ME IP

Scale

EPC Industrial PID Controller - PCT54

The PCT54 is an industrial PID controller incorporated in a console with input and output connections and controls on the front panel, designed primarily for use with the Armfield EPC series of process control products but suitable for use as a general purpose PID controller.

Requirements: 1Ph

View data sheet: www.armfield.co.uk/pct50

ChE ME IP

Scale

EPC Programmable Logic Controller - PCT55

The PCT55 is a programmable logic controller (PLC) with a graphical touchscreen control panel designed primarily for use with the Armfield EPC series of process control products, but can also be used to control other items. It is supplied with PID control algorithms implemented in ladder logic and configured to suit each of the EPC processes.

Requirements: 1Ph

View data sheet: www.armfield.co.uk/pct50

ChE ME IP

Scale

EPC Sensor Conditioning and Calibration Trainer - PCT56

The PCT56 is a trainer designed to introduce the essentials of signal conditioning applicable to process measurement sensors. It comprises an electronic console with inputs for sensors with three different types of electrical output, voltage current and resistance. The resistance input can be configured as a two-terminal or four-terminal bridge drive.

Requirements: 1Ph

View data sheet: www.armfield.co.uk/pct50

ChE ME IP

Scale

armfield

Control and acquisition systems

NEW

armBUS™ Hardware/software control and acquisition system

A revolutionary integrated hardware/software ecosystem, enabling the connection of teaching and research equipment to the modern world.

armBUS™ a radical system for integrating electronic measurement sensors and control devices onto teaching and research equipment. armBUS™ is a universal, single-wire interface which enables all peripheral sensors and control mechanisms to be connected to a digital bus with common ports. Connectivity is completely port independent, eliminating errors in the configuration of the system as well as enabling seamless integration of new sensors at any point in time.

armBUS™ can be interfaced to a variety of devices via a USB port, Network port or wireless connection enabling the equipment to be operated with a PC, PC with touchscreen, optional LCD touchscreen or a mobile device such as a tablet.

Advantages of the armBUS™ system include improved reliability, improved interchangeability and improved accuracy. All sensors are pre-calibrated, eliminating the need for further calibration after installation or if a sensor is replaced.

Applications

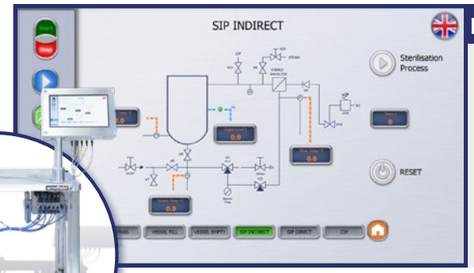
ChE	ME	CE	IP
Chemical Engineering	Mechanical Engineering	Civil Engineering	Industrial Processing

The armBUS™ standardised interface makes operating Armfield products easy for teaching and research, producing reliable data or product across multiple area's of industry.

NEW

W4-MKII:

- Teaches basic principles of filtering operations
- Measures flow rate, pressure and controllable pump
- Control and data logging via PC



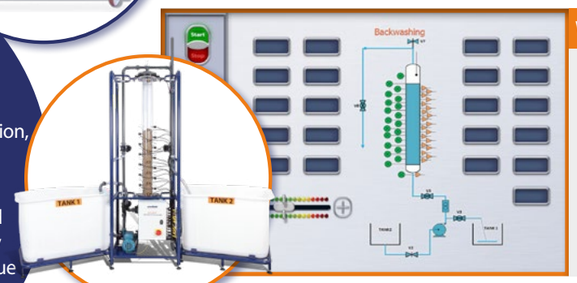
FT85:

- Designed to operate in-line with the Armfield range of UHT equipment
- Capable of standalone operation
- Intuitive user interface

One common multi–device, multi–language graphical interface

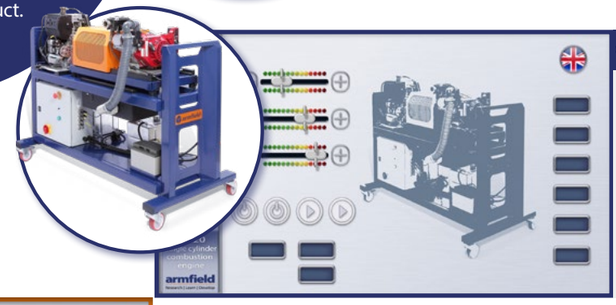
Future proof integrated support for user interaction, either via mouse, track pad or touchscreen.

The system utilises a single piece of dedicated multilingual software that is applicable to any armBUS™-enabled Armfield product. The unique software autoconfigures the user's experience and setup for each product.



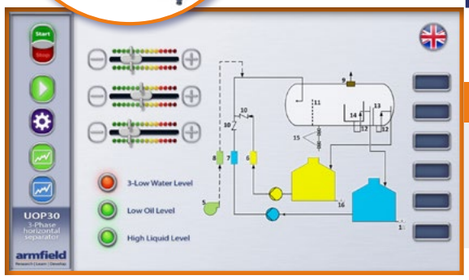
W5-MKII:

- Demonstrates effect of filtration on total head loss
- Consists 21 Pressure sensors
- Control and data logging via PC



CM20:

- Petrol and Diesel Engine test rig
- Software controlled unit
- Capable of demonstration range of engine performance characteristics
- Software Control, PID and data logging via PC



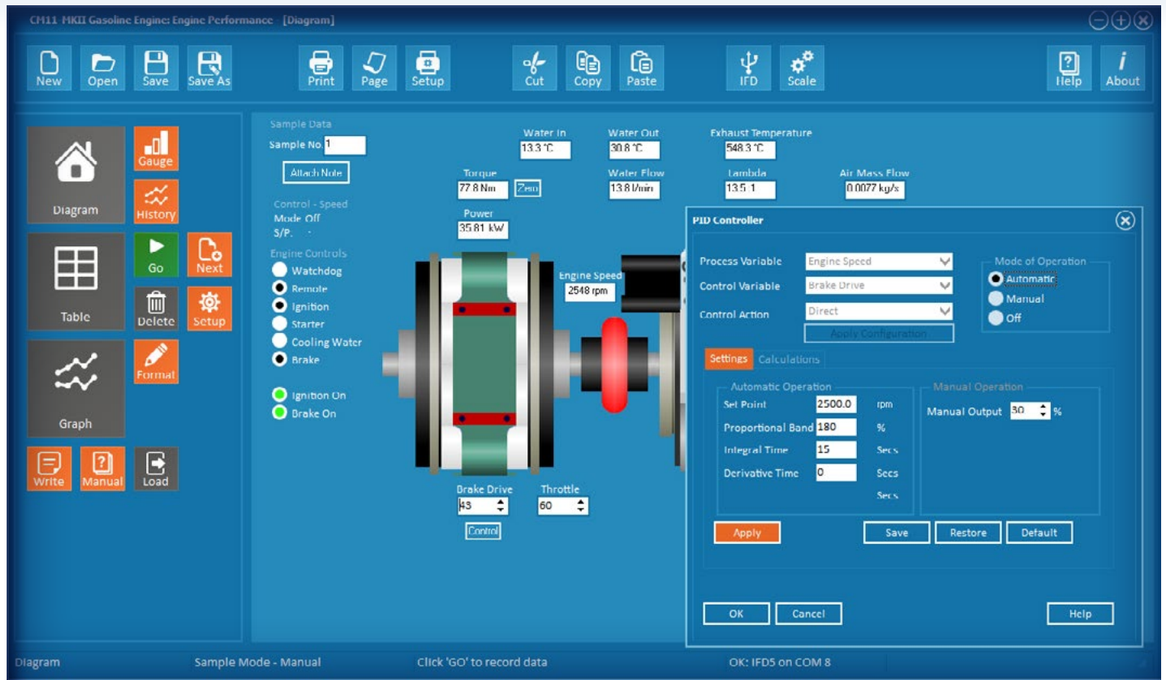
UOP30:

- 3-Phase horizontal separator
- Visual demonstration of the entire separation process
- Software Control, PID and data logging via PC

armSOFT™

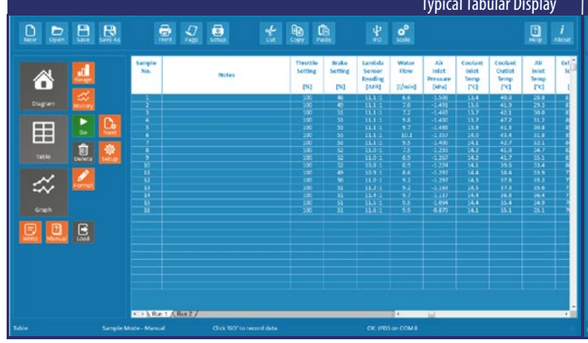
armSOFT™ data entry, data logging, acquisition and control software

Available for many Armfield products, with a wide range of features.

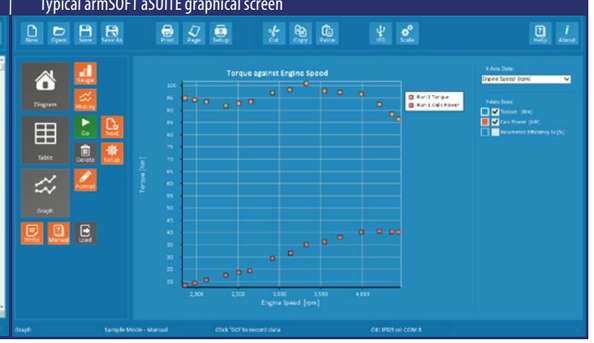


Typical armSOFT aSUITE Controller Screen

Typical Tabular Display



Typical armSOFT aSUITE graphical screen



The armSOFT™ suite of software from Armfield delivers an intuitive and simple to use range of computer applications. The user interface is generic across the range providing Powerful data entry, data logging, acquisition and control software with a wide range of features which is available for many Armfield products.

Requirements: PC, USB

Manual Data Entry - aBASIC

Some products are not suitable for data logging, and require the results to be input manually from primary instrumentation such as manometers or thermometers.

For these products the armSOFT aBASIC software offers a powerful tool for displaying and processing the results.

View data sheet: www.armfield.co.uk/armsoft — ChE ME CE IP

aBASIC™

Requirements: PC, USB

Data logging Facilities - aLITE

Powerful data logging software with automatic or manual sampling. The data is stored in spreadsheet format, which also contains any calculated values.

The software includes powerful graph plotting tools enabling numerous display options, including dual y axes, points or lines, etc.

View data sheet: www.armfield.co.uk/armsoft — ChE ME CE IP

aLITE™

Requirements: PC, USB

Acquisition and Control - aSUITE

This package has all the data logging and general features of the armSOFT aLITE package, but also includes computer control.

A mimic diagram is used where set points and output values can be specified, PID loops can be tuned, and on-off switches can be controlled.

View data sheet: www.armfield.co.uk/armsoft — ChE ME CE IP

aSUITE™

Requirements: PC, USB

LabVIEW™ Builder - aCORE

This package has all the data logging and general features of the armSOFT aSUITE but has been developed in LabVIEW™.

This has been designed to provide the user a customisable core LabVIEW™ package as a building block for customer developed LabVIEW™ programs. A full version of LabVIEW™ is required if customisation is desired.

View data sheet: www.armfield.co.uk/armsoft — ChE ME CE IP

aCORE^{LV}™

Hardware

armSOFT data logging products connect to the computer using USB interfaces. The USB interface is either built into the main equipment or via a separate control unit such as the IFD5, IFD6 or IFD7. The interface details can be seen in the requirements section for each individual product. To utilise the USB interface a computer is essentail.

armfield

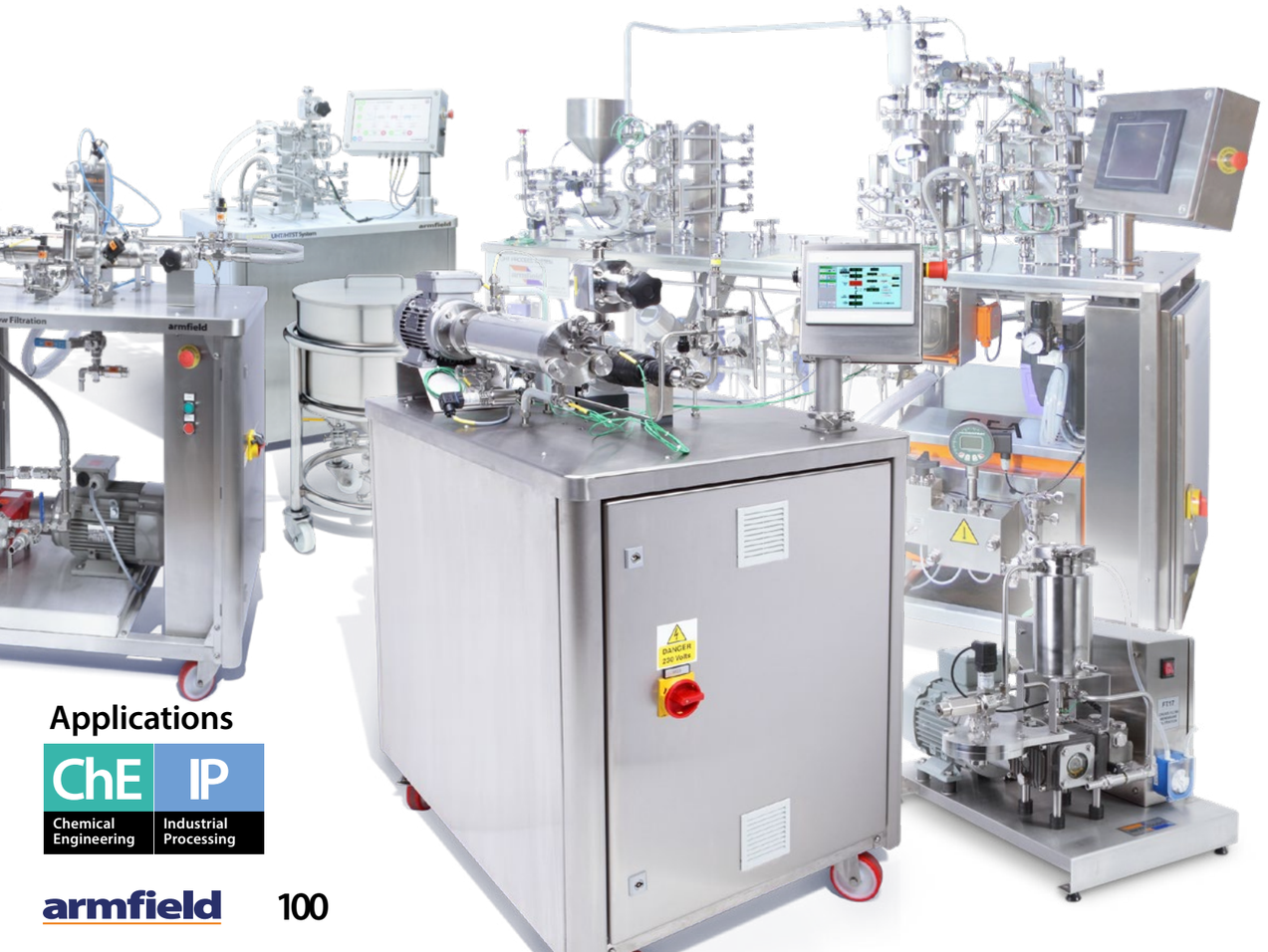
Industrial Processing & Food Technology

Industry | Education | Vocation | Research | Development | Production

Armfield can provide a complete solution to your requirements, offering not just the equipment but processing line advice, planning, installation, commissioning and training.

This range includes industry rated equipment for educational teaching, vocational training, research and development, small scale pilot and batch production for applications in the following fields:

- ▶ Dairy
- ▶ Ingredients
- ▶ Flavours & fragrances
- ▶ Edible & essential oils
- ▶ Liquid foods
- ▶ Beverages
- ▶ Cosmetics
- ▶ Pharmaceuticals
- ▶ Nutraceuticals



Applications

ChE Chemical Engineering | IP Industrial Processing

Products listed by process

HTST / Pasteurisation
- **FT174X**
- **FT74XTS**
- **FT43**
- **FT75**

HTST / Pasteurisation / UHT
- **FT174X**
- **FT74XTS**
- **FT84-12**
- **FT94X**
- **FT94LT**
- **FT142**

Homogenisation
- **FT9**
- **FT90/91**

Filling + storage
- **FT83**
- **FT85**

Carbonation / Filling / Capping
- **FT102X**
- **FT102LT**
- **FT104X** - Extends filling & capping capacity of FT102X. Enables different container types to be filled.

Deaeration
- **FT51**

Drying - (Dehydration)
- **FT30-MkIII**
- **FT31**
- **FT32**
- **FT33**
- **FT80/81** (also has chilling capability)

Spray drying
- **FT80/81** (also has chilling capability)

Margarine crystallisation
- **FT25 BP/BBP / FT25 BBPA**
- **FT40**
- **FT140**

Ice cream processing
- **FT25 BA**
- **FT25 BBPA**
- **FT40**
- **FT140X**

CIP (clean in place)
- **FT52**

Mixing
- **FT40**
- **FT140X**
- **FT141**
- **FT142** (UHT capability)

Blending
- **FT5**

Filtration - Microfiltration / Ultrafiltration / Nanofiltration & Reverse Osmosis
- **FT18-MKII** - different membranes available
- **FT17** - different membranes available

Chilling
- **FT63** or **FT64**

Pressure extraction
- **FT2**
- **FT28**
- **FT14**
- **FT110X** - 1 litre
- **FT111X** - 5, 10, & 20 litres available

Solvent extraction
- **FT29** + **UOP10*** Lab steam generator (*optional)

Refining
- **FT27**
- **FT66** + **UOP10*** Lab steam generator (*optional)

Neutralising / Washing / Bleaching
- **FT68**

Hydrogenation
- **FT67**

Cheese making
- **FT20/20A**
- **FT20-MkII**
- **FT21/21A**

Evaporation
- **FT22**

Separation
- **FT27**

Butter making
- **FT21/21A**

Freezing & Aeration
- **FT34-MkII**
- **FT36**

Sterile processing lines

HTST/UHT system options
- **FT74X** - plate + tubular heat exchanger
- **FT174X** - p,t, scraped surface H.E + DSI
- **FT94X** - up to 200l/hr
- **FT94LT** - up to 200l/hr

Homogeniser options
- **FT90** or **FT91**

Mixing tanks
- Various sizes and configurations available

Sterile filling station/storage
- **FT83** - optional UV
- **FT85**

Chiller options
- **FT63** or **FT64**

Steam generator
- **UOP10**

Modular Miniature-scale HTST/UHT Process System - FT174X

Indirect and direct processing using plate, tubular and scraped surface heat exchangers as well as DSI (or any combination). The system is capable of SIP and CIP and optional in line homogenisation for use upstream or downstream.

- Flow rates between 12-60 l/hr
- Multiple option are available to enhance your processing requirements

Can be linked to **FT83 Sterile Filler** for ESL products

Requirements: 1Ph, COLD, COMP. AIR, STEAM GENERATOR

View data sheet: www.armfield.co.uk/ft174x IP

Scale

Multifunction Laboratory Mixer - FT141
Multifunction Laboratory Mixer UHT - FT142

The FT141 & FT142 offer flexible solutions to batch processing in the food laboratory. Requiring only small quantities of product, the systems provide results representative of large-scale industrial processes.

Ideal for R&D, the systems are suitable for high shear mixing, dispersing, homogenising, emulsifying, evaporation and vacuum deaerating. The FT141 is capable of processing at 95% vacuum and up to 100°C, with the FT142 extending performance into UHT processing at up to 140°C and three bar pressure.

Requirements: 3Ph, COLD, COMP. AIR, STEAM GENERATOR

View data sheet: www.armfield.co.uk/ft141 or www.armfield.co.uk/ft142 IP

Scale

Laboratory Steam Generator - UOP10

The UOP10 is an advanced boiler, providing a constant, steady supply of steam.
The compact unit requires only connection to water and electrical supply for operation.

Requirements: 3Ph, COLD

View data sheet: www.armfield.co.uk/uop10 IP

Scale

Mixing Vessels- FT140X

Armfield FT140 Multipurpose Mixing Vessels are designed and constructed using high quality hygienic industry standard materials. These tanks are available in three models in varying configurations (see table) and are available in 50L and 100L volumes.

All three models have an internal surface made of AISI 316 stainless steel.
Available with or without heating / high shear emulsifier.

Requirements: 3Ph, COLD, DRAIN

View data sheet: www.armfield.co.uk/ft140 IP

Scale

Laboratory-Scale Rapid Extractor - FT111X

The Armfield FT111X uses high pressure and a combination of both static and dynamic extraction phases to achieve a rapid extraction of the active materials with minimum degradation to the product. In the dynamic phases, the solvent is passed through the material providing a forced percolation and agitation.
Features automatic solvent priming.

Requirements: 1Ph, COLD, COMP. AIR, N_2

View data sheet: www.armfield.co.uk/ft110 IP

Scale

Bench-top Rapid Extractor - FT110X

The Armfield FT110X uses high pressure and a combination of both static and dynamic extraction phases to achieve a rapid extraction of the active materials with minimum degradation to the product. In the dynamic phases, the solvent is passed through the material providing a forced percolation and agitation. Requires manual solvent priming.

Requirements: 1Ph, COLD, COMP. AIR, N_2

Scale

View data sheet: www.armfield.co.uk/ft110 IP

Carbonator/Filler - FT102X (shown with FT63 chiller option)

The Armfield FT102X miniature-scale carbonator enables precise and flexible carbonation and filling in the laboratory. This dramatically improves the speed with which new products can be developed.

- Features:
  Carbonates in excess of 10g/l
  Deaerates
  Fills & caps PET & glass
  Fills cans
  In bottle pressure measurement

Requirements: 1Ph, COLD, CO_2, N_2

Scale

View data sheet: www.armfield.co.uk/ft102x IP

Filler/Capper - FT104X

The FT104X is a counter pressure filling station, which can be used as an add-on filling station for the FT102X.

Requirements: 1Ph, COLD, CO_2, N_2

Scale

View data sheet: www.armfield.co.uk/ft102x IP

Carbonator/Filler - FT102LT

The Armfield FT102X has a well deserved reputation for being simply the best Carbonator-Filler on the market. The new Armfield FT102LT utilises the same technology and most of the features and benefits, in a smaller, more cost effective package.

- Carbonates in excess of 10g/l
  Deaerates
  Fills & caps PET & glass
  Fills cans
  In bottle pressure measurement

Requirements: 1Ph, COLD, COMP. AIR, CO_2, FT63

Scale

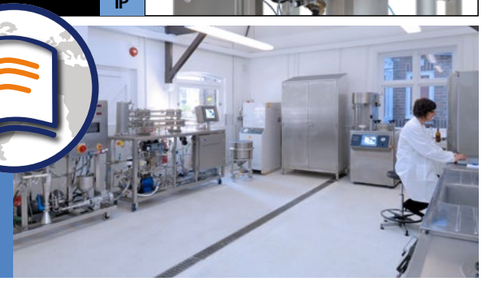
View data sheet: www.armfield.co.uk/ft102lt IP

Trial facility

Armfield have trials facilities in both the USA and Europe

Each facility has a selection of our equipment for industrial trials.

To book your trial contact > Rest of world : +44 (0)1425 478781
USA: +1 (609) 208-2800



HTST/UHT Mini Pilot System - FT94X

The Armfield FT94X HTST/UHT Mini Pilot system extends the range of continuous operation scaled-down units offered by Armfield to 30-100 l/hr. The unit combines full flexibility – plate and tubular heat exchanger options - with comprehensive instrumentation demanded of research and development equipment. Options up to 200 l/hr can be provided on special request.

See **FT64** for suitable chiller

Requirements: 1Ph, COMP. AIR, COLD, CHILLER, STEAM GENERATOR

Scale

View data sheet: www.armfield.co.uk/ft94x IP

HTST/UHT Mini Pilot System - FT94LT

FT94LT is a cost effective HTST/UHT processing system, capable of throughputs of 30-100 l/hr and process temperatures up to 150°C with a range of options, to tailor the product to your requirements.

Designed with flexibility in mind, the FT94LT Mini Pilot System is suitable for a wide range of applications, from fruit juices to ice cream, and pet food to pharmaceuticals. Options up to 200l/hr can be provided on special request.

See **FT64** for suitable chiller

Requirements: 1Ph, COMP. AIR, COLD, CHILLER, STEAM GENERATOR

Scale

View data sheet: www.armfield.co.uk/ft141 or www.armfield.co.uk/ft94lt IP

Homogenisation Sub-Systems - FT90/91

The FT90 and FT91 are complete in-line homogenisation sub-systems for use with Armfield miniature-scale food processing equipment. The FT90 is based on an APV LAB 1000 homogeniser and the FT91 is based on a Niro Twin Panda. Both homogenisers have been specifically optimised for this application

▶ Can be operated upstream or downstream of HTST/UHT process or stand alone.

Requirements: 1Ph, 3Ph, PC, USB, COLD, STEAM GENERATOR

Scale

View data sheet: www.armfield.co.uk/ft90 IP

NEW

Sterile Vessel - FT85

The Armfield FT85 Sterile Vessel can store UHT processed product for sterile filling at a later point. It eliminates product wastage associated with pilot-scale continuous operation filling systems that lack buffering capacity. The vessel is sited between Armfield's UHT processing units and the FT83 Sterile Filling System and is available with vessel sizes from 10 to 30 litres (other sizes on request). It is designed for operation with Armfield systems, but can be operated with other equipment.

Requirements: 1Ph, COMP. AIR, COLD, STEAM GENERATOR

Scale

View data sheet: www.armfield.co.uk/ft85 IP

ChE Chemical Engineering | IP Industrial Processing

Microwave UHT Add-on - FT84-12

The Armfield Microwave UHT /HTST unit has been developed for the rapid heating of various types of viscous, nonviscous and even nonhomogeneous products. Product temperatures up to 160°C can be reached. The product is heated in a short product tube enabling extremely rapid heating rates to be achieved. The add-on unit is designed to be used in conjunction with the FT74XTS, FT74X or FT94X FT94LT UHT systems.

Requirements: 3Ph

Scale

View data sheet: www.armfield.co.uk/ft84 IP

Sterile Filling System - FT83

The Armfield FT83 is the most cost-effective solution for R&D departments to produce sterile packaged samples with an excellent shelf life. As well as a working chamber with a controlled, clean environment, the unit includes the facilities to enable all the product paths to be sterilised and for the filling to be controlled in a simple manner.

▶ Integrated UV lamp option is available for increased environment sterility

NEW

Requirements: 1Ph, COLD, CO_2, COMP. AIR, UV LAMP, UHT SYSTEM

Scale

View data sheet: www.armfield.co.uk/ft83 IP

Tall Form Spray Dryer/Chiller FT80/81

The Armfield Tall Form Spray Dryer has been specifically designed to enable small quantities of product to be processed. The functional properties of the powders produced are comparable to large-scale production dryer capabilities.

The FT80 can be quickly and easily configured as a Spray Chiller (FT81) capable of handling products such as bakery shortening mixes containing high melting point fats to be converted from liquid to powder.

▶ Temperatures up to 250°C
▶ Max flow rate 7l/hr
▶ Max evaporation rate 3l/hr
▶ Measures relative humidity and all relevant chamber pressures.

Requirements: 1Ph, PC, USB, COMP. AIR

Scale

View data sheet: www.armfield.co.uk/ft80 IP

Laboratory Pasteuriser - FT75

This is an example of the modern high temperature, short time (HTST) pasteurisers used in commercial food production. It utilises a three stage plate heat exchanger and provides an excellent classroom example of the 'production line' approach to food manufacturing, complete with the associated systems and control aspects.

Options include **CW-17** Chilled water circulator and a data logging system **FT75-DTA-ALITE**, plus additional temperature sensor **STS5**.

Requirements: 1Ph, PC, USB

Scale

View data sheet: www.armfield.co.uk/ft75 IP

HTST/UHT System - FT74XA

The FT74XA is a highly flexible, miniature-scale HTST/UHT processing system which makes it ideal for new liquid product development.

It has a wide range of options to suit all needs and can be operated independently or as part of a continuous-operation process with other Armfield equipment.

- Platinum resistance temperature sensors for high accuracy
- Inclined tubular arrangement for self-draining.
- Touchscreen control of all operations
- Two-stage cooling capability for plate and tubular heat exchangers

View data sheet: www.armfield.co.uk/ft75xts IP

Requirements: 1Ph, 3Ph, COLD, FT63, PC, USB. Scale

Deodorising Unit - FT68

A vacuum steam distillation unit, suitable for demonstrating the removal of free fatty acids from edible oils. The deodorising process vessel has a batch size of 25 litres and is mounted in a floor-standing stainless steel framework, which also houses the high-vacuum equipment, control console, discharge pump and polishing filter.

View data sheet: www.armfield.co.uk/ft68 IP

Requirements: 3Ph, COLD, STEAM GENERATOR. Scale

Hydrogenation Unit - FT67

This floor-standing unit enables efficient gas/liquid mixing under controlled conditions for the study of 'hardening' of edible oils.

The FT67 is a floor-standing batch processing vessel, used to adjust the degree of saturation of 25-litre batches of edible oils. An integral part of the edible oil processing line, for use in teaching/training and research and development.

View data sheet: www.armfield.co.uk/ft67 IP

Requirements: 3Ph, COLD, COMP. AIR, STEAM GENERATOR. Scale

Neutraliser/Washer/Bleacher - FT66

A floor-standing 25 litre batch processing vessel capable of carrying out the important pre- and post refining stages of crude edible oils.

View data sheet: www.armfield.co.uk/ft66 IP

Requirements: 3Ph, COLD, COMP. AIR. Scale

Large Laboratory Process Chiller - FT64

The FT64 is a recirculating process chiller, providing a continuous supply of chilled liquid to serve as the cooling fluid when used with an Armfield miniature-scale processing unit. The FT64 is particularly suitable for larger cooling duties and for use with the Armfield FT174X, FT94LT & FT94X systems.

- Features:
  Low refrigerant charge
  Low running costs
  Easily cleaned and maintained

View data sheet: www.armfield.co.uk/ft63 IP

Requirements: 1Ph. Scale

Laboratory Process Chiller - FT63

The FT63 is a recirculating process chiller, providing a continuous supply of chilled liquid to serve as the cooling fluid when used with an Armfield miniature-scale processing unit. The FT63 is particularly suitable for use with an Armfield FT74XTS UHT and FT174X systems.

- Features:
  Low refrigerant charge
  Low running costs
  Easily cleaned and maintained

View data sheet: www.armfield.co.uk/ft63 IP

Requirements: 1Ph. Scale

CIP Unit- FT52

The Armfield FT52 has been designed to provide additional cleaning performance for Armfield FT units and other equipment. It consists of a high flow rate stainless steel centrifugal pump mounted on a mobile frame.

View data sheet: www.armfield.co.uk/ft52 IP

Requirements: 1Ph. Scale

Continuous In-line Deaerator - FT51

The Armfield FT51 deaerator unit has been designed to mirror the industrial processes of vacuum deaeration. This unit enables small quantities of food and other liquid products to be processed conveniently in the lab.

View data sheet: www.armfield.co.uk/ft51 IP

Requirements: 1Ph. Scale

Laboratory Pasteuriser - FT43

A bench top unit duplicating the industrial HTST process on a practical scale for teaching. Holding times can be varied with throughput and temperature controlled from a separate comprehensive control console. Low viscosity food samples as small as one litre can be processed in batches, or continuously processed with a throughput of 20 l/hr.

View data sheet: www.armfield.co.uk/ft43 IP

Requirements: 1Ph, PC, COLD, USB. Scale

Multi-purpose Processing Vessel - FT40

The facilities to mix, emulsify, heat, pasteurise, incubate, cool, chill and cure are all built in to this purpose designed unit. Finished products in batch sizes of 10 - 20 litres as well as materials for further processing may be produced in this versatile unit. It has integral process controls and a chart recorder to continuously monitor vat contents temperature.

A data logging accessory to store process data to a PC is available.

View data sheet: www.armfield.co.uk/ft40 IP

Requirements: 1Ph

Scale

Blast and Fluid Bed Freezer - FT36

A scaled-down insulated freezer cabinet combining two industrial processes for demonstration. Independent control of the temperature and air flow on both tray and fluid bed sections enables a variety of conditions to be demonstrated.
A data logging accessory to store process data to a PC is available.

View data sheet: www.armfield.co.uk/ft36 IP

Requirements: 3Ph, COLD

Scale

Contact Plate Freezer - FT34-MkII

The FT34-MkII Contact Plate Freezer enables previously prepared and packed products to be quick frozen using an industrial freezing process. Ideal for project work, it illustrates the improvements in taste and texture, which are obtained by a process achieving fast freezing times compared with the slower domestic freezer process times.

View data sheet: www.armfield.co.uk/ft34 IP

Requirements: 1Ph, PC, COLD, USB, DRAIN

Scale

Vacuum Freeze Dryer - FT33-MkII

A bench-top unit enabling lyophilisation of heat sensitive materials.
Fully self- contained including vacuum pump.

View data sheet: www.armfield.co.uk/ft33mkii IP

Requirements: 1Ph

Scale

Drum Dryer - FT32

A steam-heated, nip fed twin cylinder roller dryer.

- Simple drying of a material to give moisture content and the drying time (or residence time) required
- Determination of drying curves to assess the feasibility of fluidised bed drying of a material on an industrial-scale. Drying curves are relevant to the mechanism of drying - they may be used as a basis for heat and mass balance, thermal efficiency of drying and dryer design
- Calculation of heat transfer coefficients for different conditions - important in dryer design and comparison of fluidised beds with other drying methods

View data sheet: www.armfield.co.uk/ft32 IP

Requirements: 3Ph

Scale

Industrial Processing & Food Technology - FT series

Fluidised Bed Dryer - FT31

A range of materials from fine powders to food particulates can be used on this versatile laboratory-scale unit.

- High rates of heat and mass transfer
- Less than 15 minutes drying time
- Digital readout display

View data sheet: www.armfield.co.uk/ft31 IP

Requirements: 1Ph

Scale

Spray Dryer - FT30-MKIII

A bench top all-glass construction unit enabling continuous observation and measurement of this rapid drying process.

- 0-1.5 l/h product flow rate
- Air inlet temperature 200oc
- Can be used for beverages, heat sensitive material, dairy, plants, cereal and egg products

View data sheet: www.armfield.co.uk/ft30 IP

Requirements: 1Ph, COMP. AIR

Scale

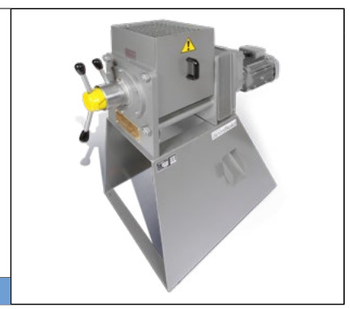
Batch Solvent Extraction & Desolventising Unit - FT29

A floor standing, self-contained 25kg batch process unit demonstrating a variety of solid/liquid extractions. It is particularly suitable for 'leaching' edible oil from oil-bearing seeds and desolventising both the extracted solids and the miscella.

View data sheet: www.armfield.co.uk/ft29 IP

Requirements: 3Ph, COLD, STEAM GENERATOR

Scale



Oil Extraction Screw Press - FT28

A small capacity continuous press suitable for extracting edible oils from a variety of oil bearing seeds.

View data sheet: www.armfield.co.uk/ft28 IP

Requirements: 3Ph

Scale

CentriPeel Centrifuge - FT27

All stainless steel basket type separator designed to save time. With an 9 litres per batch capacity and operating at up to 400G it reduces the time taken for gravity setting a liquid from several hours to a few minutes.

View data sheet: www.armfield.co.uk/ft27 IP

Requirements: 1Ph

Scale

Scraped Surface Heat Exchanger Systems - FT25

Various configurations of heat exchangers, pin workers and air incorporation are available to fulfil a wide range of process requirements.

All options provide variable control of the process throughput. With controllable process speed and up to two independent controls for rotational speed, a wide range of process variations can be explored.

- Typical configurations:
  Margarine Crystalliser
  Continuous Ice Cream Freezer
  Combined Margarine Crystalliser & Ice Cream Freezer

Requirements: 1Ph, 3Ph, PC, COLD, USB, DRAIN. Scale.

View data sheet: www.armfield.co.uk/ft25 IP

Rising Film Evaporator - FT22

A floor-standing unit using the steam-heated, climbing film principle to concentrate small quantities of liquid foods either continuously or in batches.

This unit has an integrated data logger. The important process parameters can be varied and monitored.

- Only 2 litres of raw material required to test new products
- Max evaporation rate - 10 l/hr
- Integral CIP system

Requirements: 1Ph, PC, USB. Scale.

View data sheet: www.armfield.co.uk/ft22 IP

Butter Churn - FT21

Designed to process batches of cream into butter by the traditional method.

Requirements: 1Ph. Scale.

View data sheet: www.armfield.co.uk/ft2121a IP

Cheese Vat - FT20

A stainless steel jacketed vat for the production of cheese by the traditional method. A separate electrical console provides control of paddle agitator speed, temperature and pH indication.

Requirements: 1Ph. Scale.

View data sheet: www.armfield.co.uk/ft2020a IP

Cheese Vat - FT20-MkII

The FT20-MkII is an excellent example of a batch manufacturing process, illustrating modern industrial methods and control techniques while implementing a process that has been used for centuries. It can be used to explore different methods of cheese making, different recipes and their effect on sensory perceptions. It is supported by comprehensive student and teacher instruction sheets giving detailed explanations and operational instructions. A data logging accessory **FT20-MKII-DTA- ALITE** is available.

Requirements: 1Ph, PC, USB. Scale.

View data sheet: www.armfield.co.uk/ft20 IP

Autoclave - FT19

A batch sterilising unit designed primarily for in-bottle production of sterilised milk.

Requirements: 1Ph. Scale.

View data sheet: www.armfield.co.uk/ft19 IP

Industrial Processing & Food Technology - FT series

Reverse Osmosis/Ultrafiltration Unit - FT18-MKII

A small pilot-scale cross-flow filtration system designed to operate with a range of membrane module configurations. It can be operated with as little as 5-10 litres of material to give data that is useful for process scale-up. It can be used over the full range of cross-flow filtration applications from microfiltration through to reverse osmosis.

- Integral data logging of all parameters
- Capable of Microfiltration / Ultrafiltration / Nanofiltration & Reverse Osmosis
- Ceramic, Spiral Wound, Tubular and Hollow Fibre membranes available

Requirements: 3Ph, COLD, COMP. AIR. Scale.

View data sheet: www.armfield.co.uk/ft18 ChE IP

Cross Flow Membrane Filtration - FT17

A lab-scale system for evaluating membranes in a cross flow filtration application enabling rapid determination of cross flow filtration performance using a range of membrane types with small product volumes (1 litre). It can also be used in teaching applications to demonstrate features of different membrane types and the effect of varying filtration variables.

Requirements: 1Ph, PC, USB. Scale.

View data sheet: www.armfield.co.uk/ft17 ChE IP

Disc Bowl Centrifuge - FT15

A self-contained centrifugal separator, demonstrating all aspects of cream/milk separation. Instrumentation is provided to measure varying bowl speeds and throughput rates.

Requirements: 1Ph. Scale.

View data sheet: www.armfield.co.uk/ft15 IP

Plate and Frame Filter Press - FT14

A small plate pack conveniently mounted on a stainless steel framework, enabling clear demonstration of mode of operation. Several grades of filter media are supplied.

Requirements: 1Ph. Scale.

View data sheet: www.armfield.co.uk/ft14 IP

Ribbon and Cone Blender - FT5

A bench top stainless steel ribbon blender with cone blender attachment. Variable speed drive.

Requirements: 1Ph. Scale.

View data sheet: www.armfield.co.uk/ft5 IP

Hammer/Beater Mill - FT2

A hammer mill, that is safe to operate and can be easily dismantled for cleaning. Designed for general laboratory grinding, the bench top unit is supplied with eight perforated plate screens.

Requirements: 1Ph, 3Ph. Scale.

View data sheet: www.armfield.co.uk/ft2 IP

Index

Index

"Armfield embodies and delivers a world-class support department that is core to our business ethos. Our commitment is to provide customers with real value through prompt, helpful service and online access to our dedicated support team".

Our dedicated support department, is made up of highly experienced engineers and customer service advisors to support your requirements at time of installation, aftersales queries or servicing. All our engineers are fully trained to install, train, and service our complete product range to our global market.

Aftercare:

On reciept of your equipment our support team will be responsible for fulfilling your aftercare needs.

Our aftersales Assist is available online via our website: *http://armfieldon-line.com/en/contacts/index*

Testing procedures:

All Armfield products are tested based upon a rigorous written inspection procedure, this ensures quality control and customer satisfaction.

Logistics & Warehousing:

We work with multiple global shipping experts to ensure a secure and successful on time delivery on all our shipments.

Installation & Commissioning:

A dedicated engineer will support the installation and commissioning process. This will guarantee a smooth transition for the training to take place on any ordered product within our range.

Training:

Any training requirement can be ordered at time of purchase or after delivery. Our engineers can complete comprehensive training on our product range at your site.

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Armfield products are distributed throughout the world. It is our policy in most countries to deal direct or through proven and accredited sales agents, who after suitable approval, may become exclusive representatives.

In exchange for this exclusivity they are required to offer a comprehensive service including the highest degree of after sales support.

Customer Demonstration

To arrange a demonstration please contact your local Armfield representative. Details can be found on our website here: **www.armfield.co.uk**, or contact Armfield HQ directly using the information below.

Your local Armfield Agent:

armfield worldwide

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