

The Fluid Science range is an innovative suite of products designed to enable students to gain an understanding of the fundamentals of Fluid Mechanics and Thermo Fluids by the process of learning via hands-on experimentation.

The high precision elements are supplied as modular tray-based system which operate in conjunction with the Fluid Science service unit, multifunctional work panel and instrumentation enabling the student to conduct their own individual or group experiments.

The experiments are supplied with a highly visual user-friendly operational guide, allowing the students to understand the theory of the subject by the application of practical experimentation.

The FS-4.1 Fluidised Bed tray introduces students to the concepts of bed fluidisation commonly encountered both in nature and in industry. Natural occurrences include the movement of ground water, the movement of crude petroleum or the movement of natural gas through porous media. Industrial occurrences include operations such as back-washing filters, ion-exchange processes, extraction of soluble components from raw materials and certain types of chemical reactor.

The experiment contains small-diameter glass beads in a clear glass cylinder. The drop in pressure between the inlet and outlet of the cylinder is measured as the water flows through the bed. Whilst visually allowing the students to observe the particle behaviour as the flow rate increases they can monitor the difference in pressure on flow rate to the point of fluidisation and beyond.

Experiment trays are sold separately, see **Related Products**

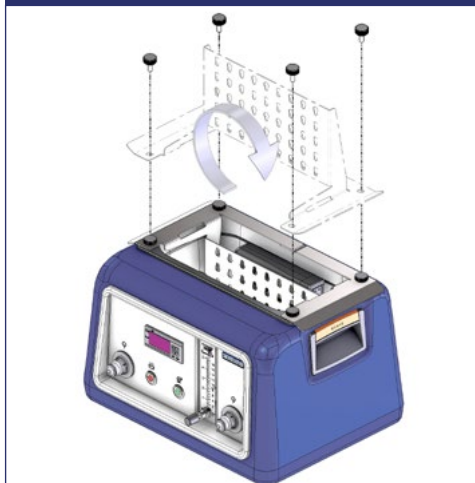


**COST EFFECTIVE MOBILE TEACHING SYSTEM DESIGNED TO INTRODUCE THE BASICS OF MANOMETRY**

Back plates is easily stored inside the unit

Configurable as hot or cold water supply

Supplied with digital manometer and thermometer



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Issue: 1

URL: <http://www.armfield.co.uk/ef>

Applications

ME ChE CE IP

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## Description

The FS-4.1 Fluidised Bed tray introduces students to the concepts of bed fluidisation commonly encountered both in nature and in industry. Natural occurrences include the movement of ground water, the movement of crude petroleum or the movement of natural gas through porous media. Industrial occurrences include operations such as back-washing filters, ion-exchange processes, extraction of soluble components from raw materials and certain types of chemical reactor.

## Requirements

## Scale



### Electrical supply:

- ▶ 100-240V/1 Phase, 50-60Hz
- ▶ Level surface
- ▶ FS experiment trays

Initial fill of 5ltrs water. Drain to empty water away once experiment is complete. During use, water supply or drainage are not required.

## Technical specifications

- ▶ Tube height: 204mm
- ▶ Tube inside diameter: 30mm
- ▶ Average bead diameter: 1.0mm
- ▶ Bed void fraction: 0.40



FS-2.2: Manometer - U tube

FS-2.1: Manometer - Inclined

FS-3.3: Cross flow

FS-3.4: Heat Exchanger - Plate

FS-3.1: Heat Exchanger - Shell and Tube

FS-3.2: Heat Exchanger - Tubular

## Overall dimensions

### Dimensions tray

Length	0.430m
Width	0.312m
Height	0.080m

### Dimensions set up (excluding power supply)

Length	0.325m
Width	0.057m
Height	0.185m

### Packed and crated shipping specifications

Net weight	2.25Kg
Gross weight	TBC

## Experimental content

- ▶ Describe packed and fluidised bed behaviour
- ▶ Describe the contributions to pressure drop in particle beds
- ▶ Describe how to model the pressure drop behaviour
- ▶ Calculate pressure drops in particle beds
- ▶ Understand the pressure drop and bed height in a fluidised bed
- ▶ Describe the forces that fluidise particles
- ▶ Kozeny-Carman equation

## Features

- ▶ Fully mobile solution
- ▶ Each service unit can be used as either a hot or cold-water supply
- ▶ Quick connect couplings for easy connection to experiment modules, self-sealing on supply unit to minimise water loss
- ▶ Digital manometer and thermometer provided with service unit
- ▶ Low voltage within the supply unit to protect users

## Benefits

- ▶ Applied student learning via experimentation
- ▶ Common service unit can be used for either hot or cold-water supply
- ▶ Toolless assembly
- ▶ Designed to be highly visual and simple to use
- ▶ Quick setup
- ▶ Suitable for both classroom, laboratory and mobile environments

## Related products

### Fluid Mechanics Range

- ▶ FS-1.1 Flow Measurement
- ▶ FS-1.2 Energy Losses - Straight pipes
- ▶ FS-1.3 Energy Losses - Bends
- ▶ FS-2.1 Manometer - Inclined
- ▶ FS-3.1 Heat Exchanger - Shell and tube
- ▶ FS-3.2 Heat Exchanger - Tubular
- ▶ FS-3.3 Heat Exchanger - Cross flow
- ▶ FS-3.4 Heat Exchanger - Plate

## Essential Accessories / Equipment

One of the range of Fluid Science service trays



## Ordering codes

FS-SU FS-4.1

## Knowledge base

- > 28 years expertise in research & development technology
- > 50 years providing engaging engineering teaching equipment

Benefit from our experience, just call or email to discuss your laboratory needs, latest project or application.

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## Aftercare

Installation  
Commissioning  
Training  
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