

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 systems 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-3.2 Fluid Science Tubular Heat Exchanger tray includes experimentation to demonstrate indirect heating or cooling by transfer of heat from one fluid stream to another when separated by a solid wall (fluid to fluid heat transfer) in a tubular heat exchanger.

COST EFFECTIVE MOBILE TEACHING SYSTEM DESIGNED TO INTRODUCE THE BASICS OF HEAT EXCHANGERS

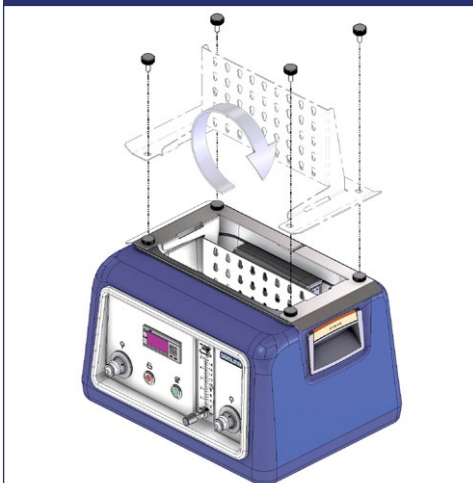
Fluid Science Tubular Exchanger Tray FS-3.2



Back plate is easily stored inside the unit

Configurable as hot or cold water supply

Supplied with digital manometer and thermometer



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

Applications

ME ChE CE IP

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Description

The Fluid Science Tubular Exchanger tray includes experimentation to demonstrate indirect heating or cooling by transfer of heat from one fluid stream to another when separated by a solid wall (fluid to fluid heat transfer) in a tubular heat exchanger.

The tray introduces students to concepts such as heat transfer coefficients, thermal resistances, controlling resistance and heat transfer driving forces. The heat exchanger can be used in a co-current or countercurrent configuration.

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

- ▶ Inner tube
- ▶ Length of tube: 550mm (measured on tube centre line)
- ▶ Outer diameter: 10mm
- ▶ Wall thickness: 1mm
- ▶ Outer diameter: 14mm
- ▶ Thermocouples 4 x K-Type
 - Cold water in
 - Cold water out
 - Hot water in
 - Hot water out

FS Series: Products



Overall dimensions

Dimensions tray

Length	0.430m
Width	0.312m
Height	0.080m

Dimensions set up (excluding power supply)

Length	0.300m
Width	0.057m
Height	0.185m

Packed and crated shipping specifications

Net weight	2.17Kg
Gross weight	TBC

Experimental content

- ▶ To demonstrate indirect heating or cooling by transfer of heat from one fluid stream to another when separated by a solid wall (fluid to fluid heat transfer).
- ▶ To perform an energy balance across a tubular heat exchanger
- ▶ To calculate the overall efficiency at different fluid flowrates.
- ▶ To demonstrate the differences between co-current flow (flows in same direction) and countercurrent flow (flows in the opposite direction) and the effect on the heat transferred, temperature efficiencies and temperature profiles through a tubular heat exchanger.
- ▶ To determine the overall heat transfer coefficient for a tubular heat exchanger using the logarithmic mean temperature difference to perform the calculations (for co-current and countercurrent flow).
- ▶ To demonstrate the differences between co-current flow (flows in same direction) and countercurrent flow (flows in the opposite direction) and the effect on heat transferred and temperature efficiencies.
- ▶ To investigate the effect of driving force with co-current and countercurrent flow.

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 Science 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-2.2 Manometer - U tube
- ▶ FS-3.1 Heat Exchanger - Shell and tube
- ▶ FS-3.3 Heat Exchanger - Cross flow
- ▶ FS-3.4 Heat Exchanger - Plate
- ▶ FS-4.1 Fluidised bed

Essential Accessories / Equipment

FS-SU Fluid Science Service Unit



Ordering codes

FS-SU

FS-3.2

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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