

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-3.1 Fluid Science Shell and Tube 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 shell and tube heat exchanger.

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

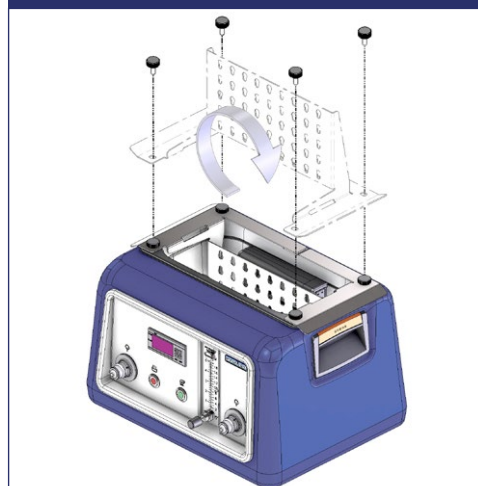
Shell and Tube Heat Exchanger Tray FS-3.1



Back plate is easily stored inside the unit

Configurable as hot or cold water supply

Shell and tube heat exchanger



UK office - email: sales@armfield.co.uk tel: +44 (0) 1425 478781 (for ROW)
USA office - email: info@armfield.inc tel: +1 (609) 208-2800 (USA only)

Issue: 1

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

Applications

ME ChE CE IP

We reserve the right to amend these specifications without prior notice. E&OE © 2023 Armfield Ltd. All Rights Reserved

Description

The Fluid Science Shell and Tube 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 shell and tube 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

- ▶ Outer shell diameter ID: 44mm OD: 50mm.
- ▶ Number of Tubes:10
- ▶ Tube length: 246mm
- ▶ Outside diameter of tubes 1/4" / 6.35mm
- ▶ Inside diameter of tubes 4.57mm (20 B.W.G tube)
- ▶ Tube material: stainless steel 316
- ▶ Thermocouples 4 x K-Type
 - Cold water in
 - Cold water out
 - Hot water in
 - Hot water out



Overall dimensions

Dimensions tray

Length	0.430m
Width	0.312m
Height	0.080m

Dimensions set up (excluding power supply)

Length	0.300m
Width	0.071m
Height	0.185m

Packed and crated shipping specifications

Net weight	2.10Kg
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 shell and tube 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 heat transferred and temperature efficiencies
- ▶ To determine the overall heat transfer coefficient for a tubular heat exchanger
- ▶ To investigate the effect of changes in hot and cold fluid flowrate on the temperature efficiencies and overall heat transfer coefficient

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-2.2 Manometer - U tube
- ▶ FS-3.2 Heat Exchanger - Tubular
- ▶ 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-3.1

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.

An ISO 9001:2015 Company



armfield.co.uk

Aftercare

Installation
Commissioning
Training
Service and maintenance
Support: armfieldassist.com