

FS
SERIES

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 as supplied modular tray-based systems which operate in conjunction with the Fluid Science service unit, FS-SU, multifunctional work panel and instrumentation enabling the student to conduct their 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.

USED TO DEMONSTRATE FLOW MEASUREMENT AND THE RELATIONSHIP BETWEEN VELOCITY AND PRESSURE DROP.

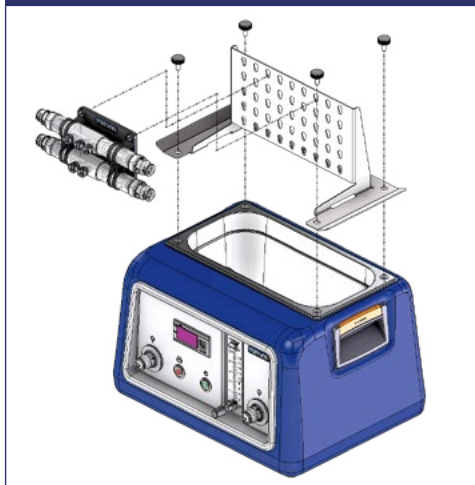
The Fluid Science Flow Meter Tray includes experiments used to demonstrate flow measurement and the relationship between velocity and pressure drop.

Flow Meter Tray **FS-1.1**



Base Unit supplied separately

Easy to follow instructions



Configurable as hot or cold water supply



Supplied with digital manometer and thermometer



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/ef>

Applications

ME ChE CE IP

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Description

Combined with the Fluid Science Service Unit, FS-SU, the Fluid Science Flow Measurement Tray, FS-1.1, provides hands on experimentation designed to demonstrate flow measurement and the relationship between velocity and pressure drop.

Utilising the FS-SU service unit the flow meters experiment rapidly mounts onto the multifunctional work panel and is connected to the built-in water supply via quick connect couplings. Differential pressure reading is taken using a digital manometer against varying flow rates. The tray includes the following flow meters:

- ▶ **Venturi meter** – used to demonstrate Bernoulli's 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.
- ▶ **Orifice plate** – 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.

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.

Essential accessories / equipment

FS-SU – Fluid Science Service Unit

Overall dimensions

Dimensions stowed

Length	0.43m
Width	0.312m
Height	0.080m

Dimensions set up (for experiment unit only, not including service unit)

Length	0.231m
Width	0.092m
Height	0.064m

Packed and crated shipping specifications

Net weight	0.32Kg (Subject to change)
Gross weight (Tray only)	1.64Kg (Subject to change)

Demonstration / instructional capabilities

- ▶ Types of flow measurement and its application
- ▶ Explain the principles of a venturi meter and an orifice meter and why one is selected over the other in certain applications.
- ▶ Pressure and velocity changes through a venturi meter i.e. increased velocity results in reduced pressure
- ▶ Energy transition in a venturi and orifice plate meter
- ▶ Mechanical energy balance on a venturi meter
- ▶ Compare pressure drop across the entrance and exit of the meter (i.e. ΔP across entrance /throat and ΔP across throat/ exit) and explain results.
- ▶ Explain the importance of discharge coefficient and calculate ideal flow rate across the both meters
- ▶ Explain the term "vena contracta", why it occurs in an orifice meter and its result (i.e. its permanent pressure loss – making it less suitable for certain applications).

Features

- ▶ Compact high precision comparison of flow meters
- ▶ Including Venturi Meter and Orifice plate
- ▶ Quick connect couplings for easy connection to experiment modules, self-sealing on supply unit to minimise water loss
- ▶ Highly Visual Design
- ▶ Flow rate control via FS-SU service unit
- ▶ Differential pressure reading obtained using digital Manometer

Benefits

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

Related products

Fluid Mechanics Range

- ▶ FS-SU Service Unit
- ▶ 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-3.2 Heat Exchanger - Tubular
- ▶ FS-3.3 Heat Exchanger - Cross flow
- ▶ FS-3.4 Heat Exchanger - Plate
- ▶ FS-4.1 Fluidised bed



Ordering codes

FS-SU
FS-1.1

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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