

The Fluid Science range is an innovative suite of products designed to demonstrate energy losses due to the geometry of the flow path. This enables students to gain an understanding of the fundamentals of Fluid Mechanics and Thermo Fluids by the process of learning via hands-on experimentation.

The Fluid Science Energy Losses in Hydraulic Systems Straight Pipe Tray includes experiments to measure the pressure drop across expansion and contraction and an internal artificially roughened pipe. All except the stepped pipe test section are of the same cross section, 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.

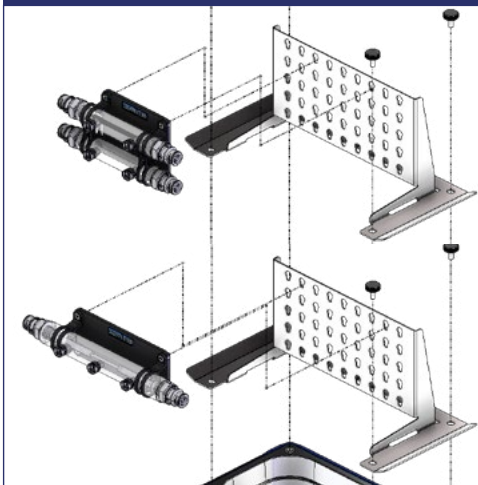
USED TO DEMONSTRATE ENERGY LOSSES DUE TO THE GEOMETRY OF THE FLOW PATH

Flow Meter Tray **FS-1.2**



Base Unit supplied separately

Easy to follow instructions



Internally roughened pipe



Expansion and contraction pipe



Supplied with digital manometer and thermometer



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Issue: 1

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Applications

ME ChE CE IP

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## Description

The Fluid Science FS-1.2 Energy Losses in Straight Pipes Tray provides hands on experimentation designed to demonstrate energy losses due to the geometry of the flow path at different flow rates.

Utilising the FS-SU service unit the experiments rapidly mount 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 Hydraulic Circuits:

- ▶ Smooth and Roughened pipe 6mm diameter
- ▶ Contraction and expansion 8mm – 4mm – 8mm diameters

## Requirements

## Scale



### Electrical supply:

- ▶ 100-240V/1 Phase, 50-60Hz

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 – Trays measure

Length	0.43m
Width	0.312m
Height	0.080m

### Dimensions set up for smooth and rough bore

Length	0.21m
Width	0.092m
Height	0.064m

### Dimensions set up for stepped bore pipe

Length	0.21m
Width	0.092m
Height	0.064m

### Packed and crated shipping specifications

Net weight	1.41Kg
Gross weight (Tray only)	4.02Kg

## Demonstration / instructional capabilities

- ▶ Explanation of basic principles such as conservation of mass
- ▶ Conservation of energy
- ▶ Explain energy loss and frictional loss
- ▶ Types of flow steady and unsteady flow, uniform and non-uniform flow etc
- ▶ Types of fluid flow regime i.e. laminar, turbulent and transitional flow
- ▶ Compare measured pressure drop from 3 different pipe forms, explaining the effect of geometry on pressure drop.
- ▶ Using Bernoulli's equation, calculate the pressures and compare results with experimental values.
- ▶ Calculate the frictional head loss and pressure drop using Darcy's equation

## Features

- ▶ Smooth and Roughened pipe 6mm diameter
- ▶ Contraction and expansion 8mm – 4mm – 8mm diameters
- ▶ Differential pressure reading obtained using digital manometer
- ▶ Highly visual design

## 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-1.1 Flow Measurement
- ▶ 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-1.2

## 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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## Aftercare

Installation  
Commissioning  
Training  
Service and maintenance  
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