

**Hele Shaw Apparatus – F1-38**

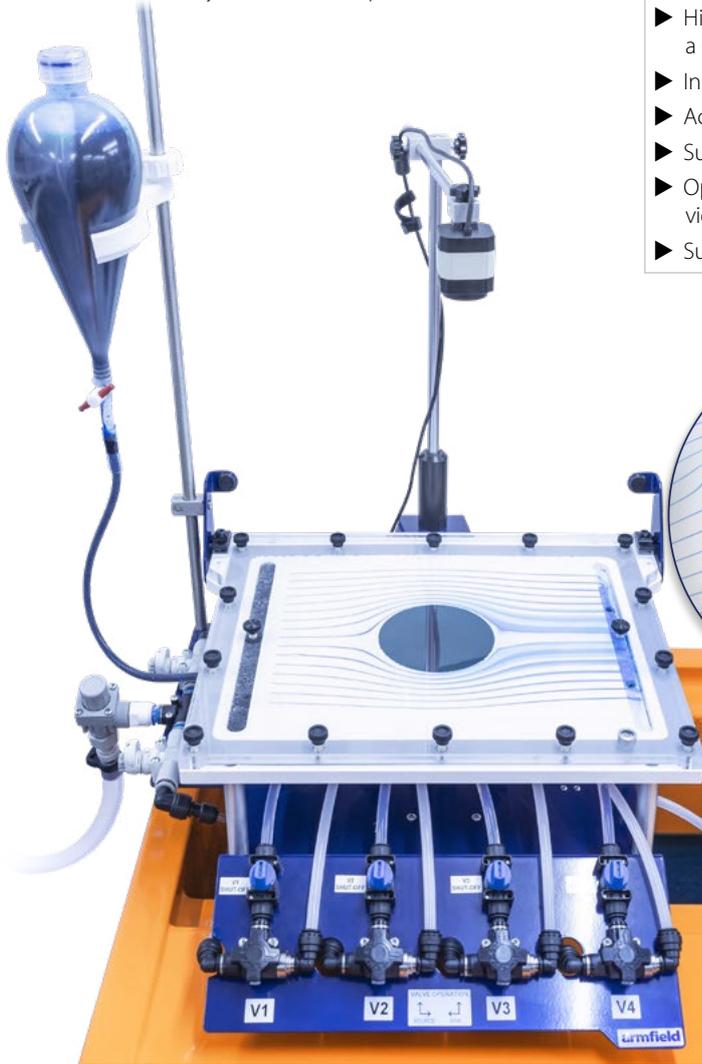
The Armfield F1-38 Hele Shaw Apparatus enables investigation into the principles of potential flow and enables modelling of appropriate physical systems.

It allows students to study various source and sink arrangements and look at flow around a variety of different shaped models.

**EXPERIMENT TO DEMONSTRATE POTENTIAL FLOW IN FLUID DYNAMICS**  
**SUPPLIED WITH SPARE MATERIAL FOR USER DEFINED SHAPES**  
**SUPPLIED WITH COMPREHENSIVE MANUAL**

**Features**

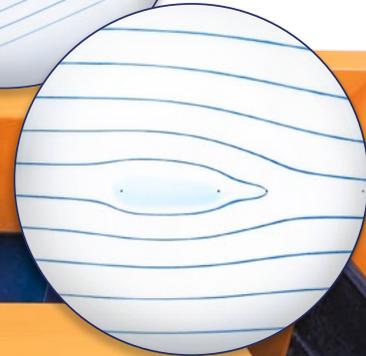
- ▶ Highly visual apparatus enabling the demonstration of a wide variety of flow patterns around different shapes
- ▶ Includes dye injection system
- ▶ Accessory to F1-10 bench
- ▶ Supplied with spare material for user defined shapes
- ▶ Optional visualiser F1-36b allows the user to capture or project video or still images via use of the supplied USB camera
- ▶ Supplied with comprehensive manual



F1-38- Flow through a sudden contraction



Sinks and sources may be used in combination with the flow of water between the plates to simulate a variety of flow situations.



F1-38 - Hele Shaw Apparatus

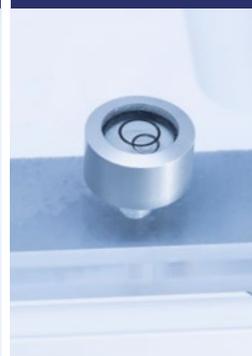
Valve operation and shut-off taps



Flow straightener and dye injection system



Bubble level



Capture video or still images



## Description

The F1-38 Hele-Shaw Apparatus provides a very visual means of showing potential flow in the field of fluid dynamics. The water flows through a very narrow channel which is formed between two plates causing the water to flow in a special way.

The mean velocity of the water along the channel obeys equations as those for local velocity in potential flow. The water flow within the channel is designed to be in a steady, laminar state.

The apparatus injects dye (by gravity) into the water flow to produce streamlines that clearly show the effect of different flow conditions around shapes and/or with the use of sinks and sources.

F1-38 Hele-Shaw Apparatus is a demonstration of classic experiments with visualisation of flow behaviour by injection of dye as a steady flow in a working cell.

The apparatus is designed to fit onto the top of the standard F1-10 series Hydraulic Bench forming part of the F1 series fluid mechanics' range.

The F1-10 Hydraulics Bench can be used as a work surface and water collection sump.

The apparatus requires a supply of clean cold water with an optional overhead tank, (F1-38a supplied separately) available if required.

In addition the optional F1-38b Visualisation accessory allows the user to capture or project video or still images via use of the supplied USB camera.

## Technical specifications

### Working section

Viewing Area	892mm
Sinks/source/closed	4 points
Dye injectors	16
Dye	Food based dye
Flow control valve	Operates fully closed (0) to fully open(11)
Camera requirements	USB - PC: Windows 10, 8, 7, Vista, XP
Operational water pressure minimum/maximum	0.2 – 0.3bar

### Models supplied

A set of basic model shapes are provided to analyse flow patterns around these. Further models can be cut from the same material used in the standard models to ensure compatibility with the unit

### Ordering specification

- ▶ Desktop or F1-10 bench mounted apparatus, demonstrates ideal flow, and Hele-Shaw principles and is able to accept student-made models
- ▶ Working section dimensions 345mm x 265mm
- ▶ Actual viewing area 295mm x 245mm
- ▶ Comprehensive instruction manual with illustrations

### Overall dimensions

Length	0.50m
Width	0.44m
Height	0.78m

### Packed and crated shipping specifications

Volume	0.3m <sup>3</sup>
Gross weight	40Kg

## Experimental content

### ▶ Ideal flow around immersed bodies

- Cylinder
- Aerofoil
- Bluff body

### ▶ Ideal flow associated with sinks and sources

- Formation of a Rankine half body
- Formation of a Rankine oval
- Circular streamlines from a doublet
- Superposition of sinks and sources user defined shape

### ▶ Ideal flow in channels and at boundaries

- Convergent channel
- Divergent channel
- 90-degree bend
- Sudden contraction
- Sudden enlargement

## Requirements



## Scale

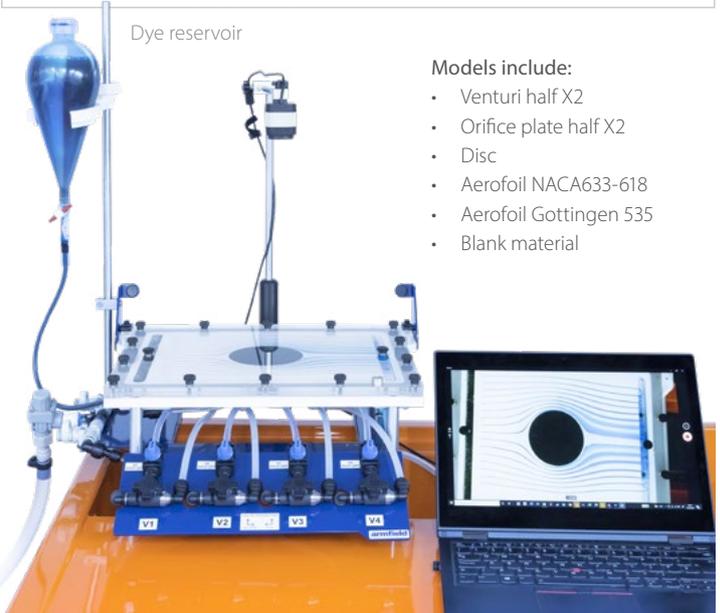


### Water supply

Drain: Suitable for water containing dye

## Optional accessories

- ▶ **F1-38a Header Tank:** If mains water cannot be connected
- ▶ **F1-38b Visualiser:** Auto-focusing. Still and video capture  
Mac: OS 10.12 and later (Mac OSX 10.5 and later compatible)  
PC: Windows 10, 8, 7, Vista, XP



Dye reservoir

### Models include:

- Venturi half X2
- Orifice plate half X2
- Disc
- Aerofoil NACA633-618
- Aerofoil Gottingen 535
- Blank material

## Ordering codes

- ▶ F1-38
- ▶ F1-38a
- ▶ F1-38b

Armfield standard warranty applies with this product

## 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



Products CE certified

[armfield.co.uk](http://armfield.co.uk)

## Aftercare

Installation  
Commissioning  
Training  
Service and maintenance  
Support: [armfieldassist.com](http://armfieldassist.com)