W SERIES

PERMEABILITY / FLUIDISATION STUDIES APPARATUS – W3MkII

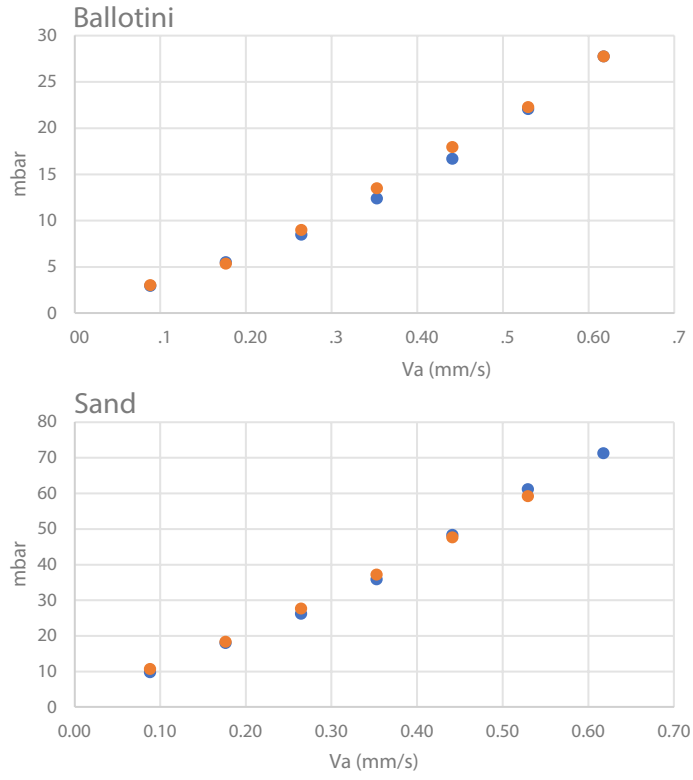
The W3MKII Permeability/Fluidisation Apparatus enables permeability, fluidisation and attrition testing to be demonstrated using tap water, and suitable porous granular media.

Students can measure and understand the characteristics of flow through a bed of particles and test various media that may be contemplated for use in deep bed filters.

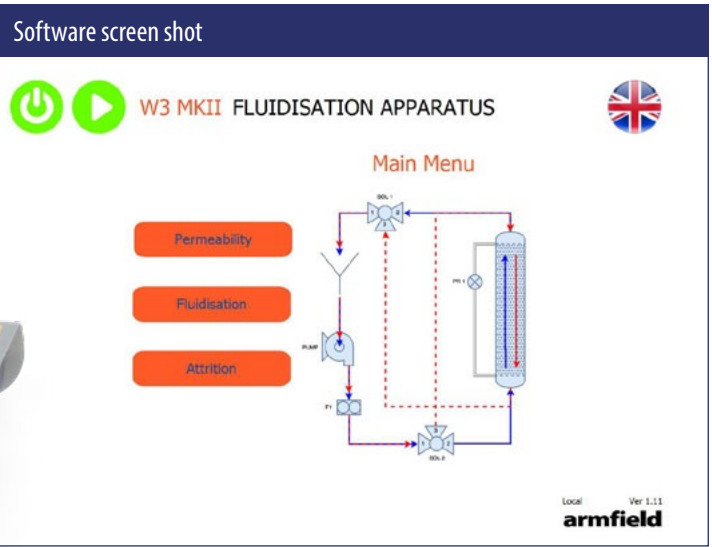
UNIVERSAL SINGLE-WIRE INTERFACE
CONTROL AND DATA LOGGING VIA PC
ELECTRONIC PRESSURE SENSOR

Permeability test data

Approach Velocity vs Pressure Curve for Sand and Ballotini



Software screen shot



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: 2
URL: http://www.armfield.co.uk/w3
Applications
ChE CE IP

Description

A bed of granular medium (usually Ballotini, but other materials can be used, such as sand or anthracite) is placed in a readily demountable tube through which water can be made to flow in either downward through the column to demonstrate permeability or upwards to demonstrate attrition and fluidisation.

At the base of the column is a sieve mesh to retain granular material. Differential pressure sensor enables measurement of pressure drop across the bed. The test section tube and all tubing connections are transparent to allow entire process to be observed and the presence of air bubbles easily detected.

Learning objectives

- Pressure-drop measurements and correlations for flow through packed beds
- Verification of Kozeny's equation
- Characteristics of a liquid fluidised bed
- Measurement of permeability of selected solids
- Attrition tests

Requirements

- **Electrical supply:** supplied with a universal mains adaptor suitable for 100-240V / 1ph / 50-60Hz
- Software requires a computer running Windows XP or above with a USB port (computer not supplied by Armfield)
- Alternative bed materials such as sand, anthracite (not supplied)

Scale

Technical details

Sample tube I/D	0.038m
Sample tube length	0.507m
Pump	24 L/hr
Flow meter range	0-3 L/min
Glass funnel	1.5L
Solenoid valves	2
Pressure range	0-5 psi

Overall dimensions

Length	0.43m
Width	0.38m
Height	0.97m
Packed and crated shipping specifications	
Volume	1.5m^3
Gross weight	15Kg

Features / benefits

- Metal framework with transparent test section for observation
- Control and data logging via PC
- Flowmeter to measure the flowrate
- Solenoid valves for automatic selection of process
- Operational manual with teaching exercises
- Universal single-wire interface
- Electronic pressure sensor

Software

The ArmBUS software enables the operator to select the appropriate stage of the process and a mimic diagram with measured variables is displayed. The speed of the pump can be varied to meet the required flow rate.

Results are saved in a log, which can be viewed and manipulated with the ArmBUS results viewer. Results can be printed or exported in a spreadsheet format, which can be opened in a wide range of packages for further analysis.

Optional accessories

- Sieve shaker (CEN MKII-13)

Ordering specification

- Apparatus to verify Darcy's law, to examine Kozeny's equation and to observe liquid fluidisation behaviour of a granular bed
- Equipment consists of a metal framework, transparent test section for observation
- Pump 24 L/hr
- 2 x Solenoid Valves
- Differential Pressure Sensor 0-5psi
- 1.5L glass funnel
- Test material (Ballotini) for the packed bed is supplied with the unit
- Software for control and data logging
- Operational manual with teaching exercises

Ordering codes

- W3-MkII
- CEN MKII-13 (optional)

Warranty

Armfield standard warranty applies with this product