The CEL-MkII is designed to facilitate the study of flow through fixed and fluidized beds of solid particles.
This new improved MkII version has three columns, one for use with water and two for use with air. The separate air and water columns enable the difference between ‘aggregative’ and ‘particulate’ fluidized bed characteristics to be demonstrated. The two air columns enable the effect of different packing material sizes to be demonstrated without having to remove, empty and repack a column.
The MkII version also benefits from full electronic instrumentation and powerful armSOFT data logging software.
Upward flow of fluid through a bed of particles is a naturally occurring phenomenon, for example in the movement of ground water. Industrial applications include ion exchange, extraction of soluble components from raw materials and other chemical processes. The Armfield CEL-MkII apparatus facilitates the study of flow through fixed and fluidized particle beds. The simultaneous study of air and water systems and the phenomenon of 'bubbling' can be observed. The apparatus comprises three clear acrylic columns mounted above a moulded ABS base. The base contains a water reservoir with a variable-speed submersible pump that pumps water through an electronic flow meter into the base of the left-hand column. This column features an overflow pipe that returns the water back into the sump. The two air columns are fed by variable pressure regulators, which can be used to adjust the air flow rate through the column. The air flow rate is measured using pressure sensors at discharge orifices at the top of the columns. The integral microcontroller calculates the flow rates from the pressure readings and displays these on the front panel. Pressure drops on all three columns are measured by differential pressure sensors connected to tapping points at the top and bottom of the columns. All process measurements are displayed simultaneously on the front panel display and are available on the USB output for data logging. The software also provides powerful graph-plotting facilities.

**DESCRIPTION**

Flow and pressure for each column is clearly displayed via the LCD screen. Demonstration of fluidization and liquefaction

**OPTIONAL ACCESSORIES**

Air Compressor, AC1
- Max pressure: 8 bar
- Max air flow: 100 l/min at 1 bar
- Capacity: 6l
- Motor power: 820W
- Weight: 8.8kg
- Noise: 80dB typical at 1m

**FOR FURTHER INFORMATION ON THE ADVANCED FEATURES OF THE SOPHISTICATED ARMFIELD SOFTWARE VISIT:**
discoverarmfield.com/en/products/view/armsoft/software

**ORDERING CODES**

<table>
<thead>
<tr>
<th>Model</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEL-MkII</td>
<td></td>
</tr>
<tr>
<td>CEL-MkII-EU</td>
<td>with Schuko mains lead</td>
</tr>
<tr>
<td>CEL-MkII-UK</td>
<td>with UK mains lead</td>
</tr>
<tr>
<td>CEL-MkII-B</td>
<td>with USA 115V mains lead</td>
</tr>
<tr>
<td>AC1</td>
<td></td>
</tr>
<tr>
<td>AC1-A</td>
<td>220-240V / 1ph / 50Hz</td>
</tr>
<tr>
<td>AC1-B</td>
<td>120V / 1ph / 60Hz</td>
</tr>
<tr>
<td>AC1-G</td>
<td>220-240V / 1ph / 60Hz</td>
</tr>
</tbody>
</table>

**OVERALL DIMENSIONS**

<table>
<thead>
<tr>
<th>Column</th>
<th>Length</th>
<th>Height</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEL-MkII</td>
<td>1.00m</td>
<td>0.83m</td>
<td>0.50m</td>
</tr>
<tr>
<td>AC1</td>
<td>0.29m</td>
<td>0.40m</td>
<td>0.45m</td>
</tr>
</tbody>
</table>

**SHIPPING SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Column</th>
<th>Volume</th>
<th>Gross weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEL-MkII</td>
<td>0.6m³</td>
<td>35kg</td>
</tr>
<tr>
<td>AC1</td>
<td>0.3m³</td>
<td>20kg</td>
</tr>
</tbody>
</table>

**COMPLEMENTARY PRODUCTS**

- CEX MKII - Fluid Mixing Studies  
- CEN MKII - Solids Handling Study Bench  
- CERa MKII - Gaseous Diffusion Coefficient Apparatus  
- CERb - Liquid Diffusion Coefficient Apparatus  
- CES - Wetted Wall Gas Absorption Column  
- CEU - Catalytic Reactors  
- CEXC - Computer Controlled Chemical Reactor Teaching Equipment + 5 reactor types  
- UOP5 MKII - Liquid/Liquid Extraction Unit  
- UOP7 MKII - Gas Absorption Column  
THE COMPLETE CE RANGE

CEK MKII - Fluid Mixing Studies

CEL MKII - Fixed and Fluidized Bed Apparatus

CEN MKII - Solids Handling Study Bench

CEQ - Corrosion Studies Kit

CERa MKII - Gaseous Diffusion Coefficient Apparatus

CERb - Liquid Diffusion Coefficient Apparatus

CES - Wetted Wall Gas Absorption Column

CEU - Catalytic Reactors

CEXC - Computer Controlled Chemical Reactor
Teaching Equipment + 5 reactor types

CEP MKII - Stirred Tank Reactors In Series

ORDERING SPECIFICATION

• A benchtop apparatus for the study of fixed and fluidized beds of solid particles
• Three cylindrical columns, one for water and two for air, each column with a diameter of 50mm and height of 550mm
• Columns mounted above a blue ABS moulded base containing an 8l water reservoir
• Two sizes of bed material supplied, ranges: 0.5-0.75mm and 0.2-0.3mm
• Complete with a demonstration of liquefaction and how the properties of liquefied particles change with agitation
• Variable-speed submersible pump to recirculate water, rate up to 2 l/min
• Each column has tapping points and differential pressure sensors
• Air flow rate measured by orifice pressure sensors, the flow rate being calculated by an integral microcontroller
• Electronic front panel display shows flow rates and pressure drops for all three columns simultaneously
• Powered by universal power adaptor with worldwide approvals
• Supplied with powerful data logging software (PC not supplied)