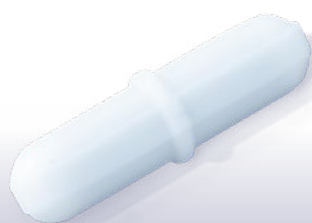


Liquid Diffusion Coefficient Apparatus - CERb

The liquid diffusivities coefficient apparatus laboratory equipment has been designed to enable measurement of molecular diffusivities relating to an equimolar counter-diffusion process and in so doing, familiarise students with the basic notions of mass transfer theory.



CERb: Magnetic stirrer



Experimental content - CERb

- ▶ Accurate measurement of mass transfer rates in the absence of convective effects
- ▶ Use of Fick's law to deduce diffusion coefficients from measurements of mass transfer rate and concentration difference
- ▶ Simple analysis of a first-order unsteady state process effect of concentration on diffusion coefficients
- ▶ To determine the diffusion coefficient of 1M NaCl solution
- ▶ Gaining familiarity with the use of laboratory instruments to achieve accurate measurements of data required for industrial process design

Description

Armfield has developed a unique diffusion cell which overcomes the traditional problem of slow diffusion rates in liquids requiring long observation times but without sacrificing accuracy or introducing convective effects. Essentially, the cell consists of a honeycomb of accurately dimensioned capillaries positioned between two liquids of differing concentration of the solute, whose diffusion coefficient is to be determined.

In practice, a small volume of concentrated solution is placed on one side of the honeycomb, whilst the other side consists initially of a large volume of pure solvent (water). As diffusion of the solute occurs, the concentration within the larger volume increases and is monitored with a conductivity sensor and meter.

The mixture is continuously stirred with a magnetic stirrer to ensure uniform concentration within the bulk liquid.

Whilst the conductivity sensor may be readily calibrated for any required aqueous system, for introductory studies dilute solutions of sodium chloride are recommended, for which conductivity data is provided.

Requirements

Scale

PC USB



Electrical supply: Battery operated

Software requires the user to have a PC running Windows 7 or above with a USB port.

Recommended accessories

Stop clock

Cartridge dioniser



Overall dimensions

Height	0.31m
Diameter	0.19m

Conductivity meter

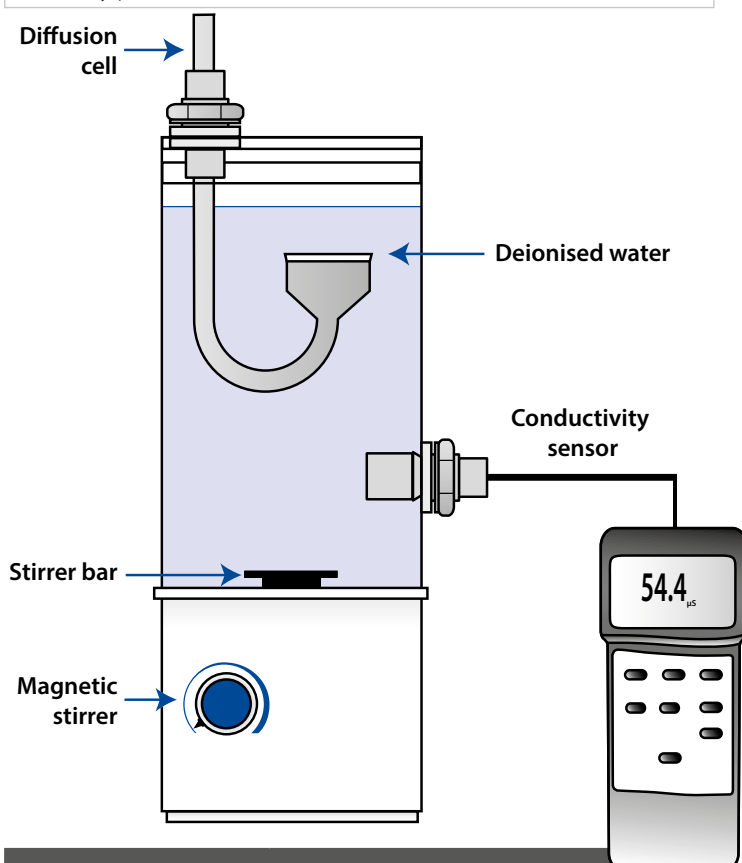
Length	0.25m
Width	0.20m
Height	0.13m

Packed and crated shipping specifications

Volume	0.10m ³
Gross weight	10Kg

Ordering specification

- Bench mounted apparatus for the determination of diffusion coefficients of components in the liquid phase. The method employs a diffusion cell of capillary tubes so constructed to permit equimolar counter diffusion between liquids of differing concentration each side of the cell without convective effects being present
- Concentration changes on one side of the cell with respect to time are measured with the conductivity cell and the meter provided and a magnetic stirrer keeps the bulk solution well mixed
- Possible to obtain reproducible and accurate values of diffusivity within a period of 1.5 hours of practical laboratory time
- Battery powered



Technical specifications

Diffuser vessel	Capacity 1l
Conductivity meter	3 ranges 199.9µS to 19.99mS
Computer output	RS232

Related products

- CERa MkII: Gaseous Diffusion Coefficient Apparatus
- CES: Wetted Wall Gas Absorption Column
- UOP3BM: Batch Distillation Column
- UOP3CC: Computer Interfaced Distillation Column
- UOP4MkII: Solid-Liquid Extraction Unit
- UOPS: Liquid-Liquid Extraction Unit
- UOP7: Gas Absorption Column

Ordering codes

CERb

Knowledge base

- > 28 years expertise in research & development technology
- > 50 years providing engaging engineering teaching equipment

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