

Electronic Console

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### DESCRIPTION

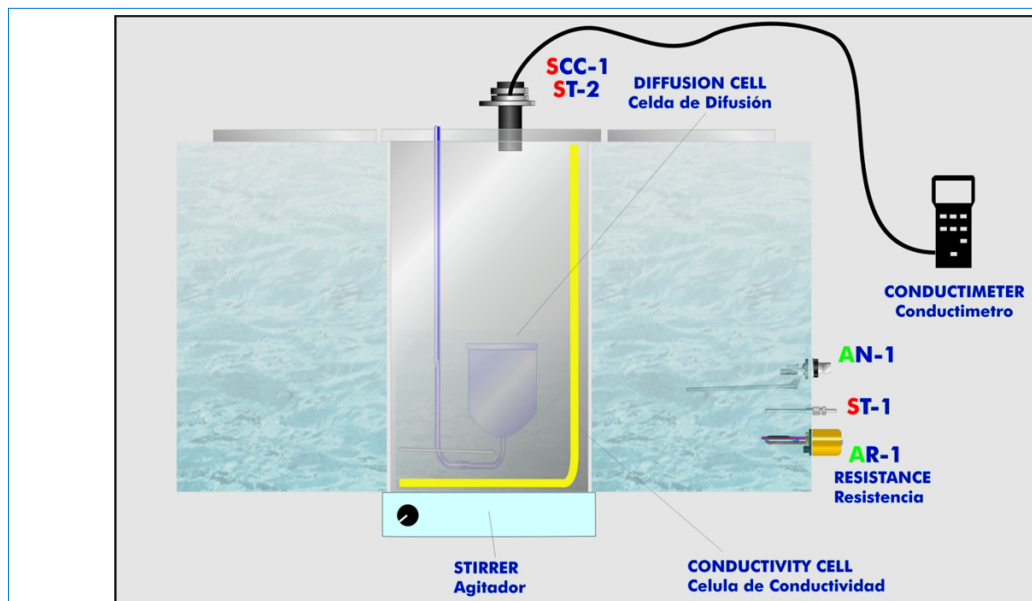
The QDTL is a teaching unit that allows to students to familiarise with the notions of mass transfer theory, specially about the diffusion in liquid systems, obtaining experimental data and results which are very useful for an ideal practice understanding of the process and consequently, for the technical teaching of the students.

The experimental determination of the diffusion coefficient  $D_{AB}$  for a binary mixture, can be done with a device such as the one described below.

A small volume tube with a filtering cell which has a certain number of pores has been placed at one of its ends. A concentrated solution of salt (sodium chloride) has been introduced inside. The tube is introduced in a vessel with pure solvent (distilled water). Now, the diffusion starts, and it will be indirectly measured by the conductivity data.

A thermostatic bath let us to make the experiments at different temperatures.

### PROCESS DIAGRAM AND ELEMENTS ALLOCATION



Note:

AN= Level switch.

ST= Temperature sensor.

AR= Heating resistance.

SCC= Conductimeter.



ISO:9001-2000 Certificate of Approval. Reg. No. E204034



European Union Certificate



Certificates ISO 14001: 2004 and ECO-Management and Audit Scheme (environmental management)



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**Unit:**

Bench-top unit.

Anodized aluminium structure and panels in painted steel.

Main metallic elements in stainless steel.

Diagram in the front panel with similar distribution to the elements in the real unit.

Transparent liquid tank (experimentation vessel), capacity: 2.5 litres.

Magnetic stirrer (range: 0-300 r.p.m.) and magnet.

Conductivity meter:

Conductivity

<u>Range</u>	<u>Measurement</u>	<u>Resolution</u>	<u>Accuracy</u>
200 $\mu$ s	0.1 to 199.9 $\mu$ s	0.1 $\mu$ s	
2 ms	0.2 to 1.999 ms	0.001 ms	( $\pm 6\%$ FS+2dgt)
20 ms	2 to 19.99 ms	0.01 ms	

$\mu$ s - micro Siemens; ms- milli Siemens.

Temperature

Measurement range= 0 °C to 60 °C

Resolution= 0.1 °C

Accuracy= 0.8°C

Conductivity sensor.

Diffusion cell:

Capillaries number (N) = 317.

Capillary length (x) = 5 mm.

Capillary diameter (D) = 1 mm.

Thermostatic bath:

Water bath, capacity: 8 litres.

Heating resistance, 500 W.

Level switch.

Temperature sensor, "J", range: -40 to 750°C.

Electronic Console:

Metallic box.

Temperature sensor connection.

Heating resistance switch.

Heating resistance temperature controller.

Level switch connection.

Stirrer switch.

Cables and Accessories, for normal operation.

Manuals:

**This unit is supplied with the following manuals:** Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

**EXERCISES AND PRACTICAL POSSIBILITIES**

Some Practical Possibilities of the Unit:

- |  |   |
|--|---|
| <p>1.- Fick 's law application to calculate the diffusivity.</p> <p>2.- Accurate measurement of mass transfer rates.</p> <p>3.- Determination of the molar density rate.</p> <p>4.- Effect of concentration on diffusion coefficients.</p> <p>5.- Simple analysis of a first order unsteady state process.</p> <p>6.- Concentration and conductivity relation.</p> | <p>7.- Study of the effect of the temperature on diffusion coefficients.</p> <p>8.- Gaining familiarity with the use of laboratory instruments to achieve accurate measurements of data required for industrial process design.</p> |
|--|---|

## REQUIRED SERVICES

- Electrical supply: single-phase, 220V./50Hz or 110V./60Hz.
- Distilled water.
- NaCl.

## DIMENSIONS & WEIGHTS

- Unit: - Dimensions: 500 x 370 x 500 mm. approx.  
- Weight: 20 Kg. approx.
- Electronic Console: - Dimensions: 300 x 230 x 135 mm. approx.  
- Weight: 2 Kg. approx.

## RECOMMENDED ACCESSORIES

- Stop Clock.

## AVAILABLE VERSIONS

Offered in this catalogue:

- QDTL. **Liquid Mass Transfer and Diffusion Coefficient Unit.**

Offered in other catalogue:

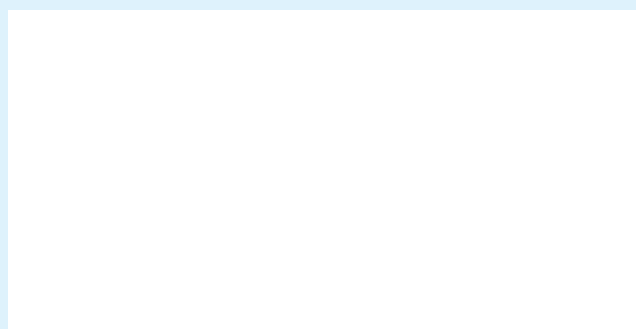
- QDTLC. **Computer Controlled Liquid Mass Transfer and Diffusion Coefficient Unit.**

\* Specifications subject to change without previous notice, due to the convenience of improvements of the product.



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REPRESENTATIVE:



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