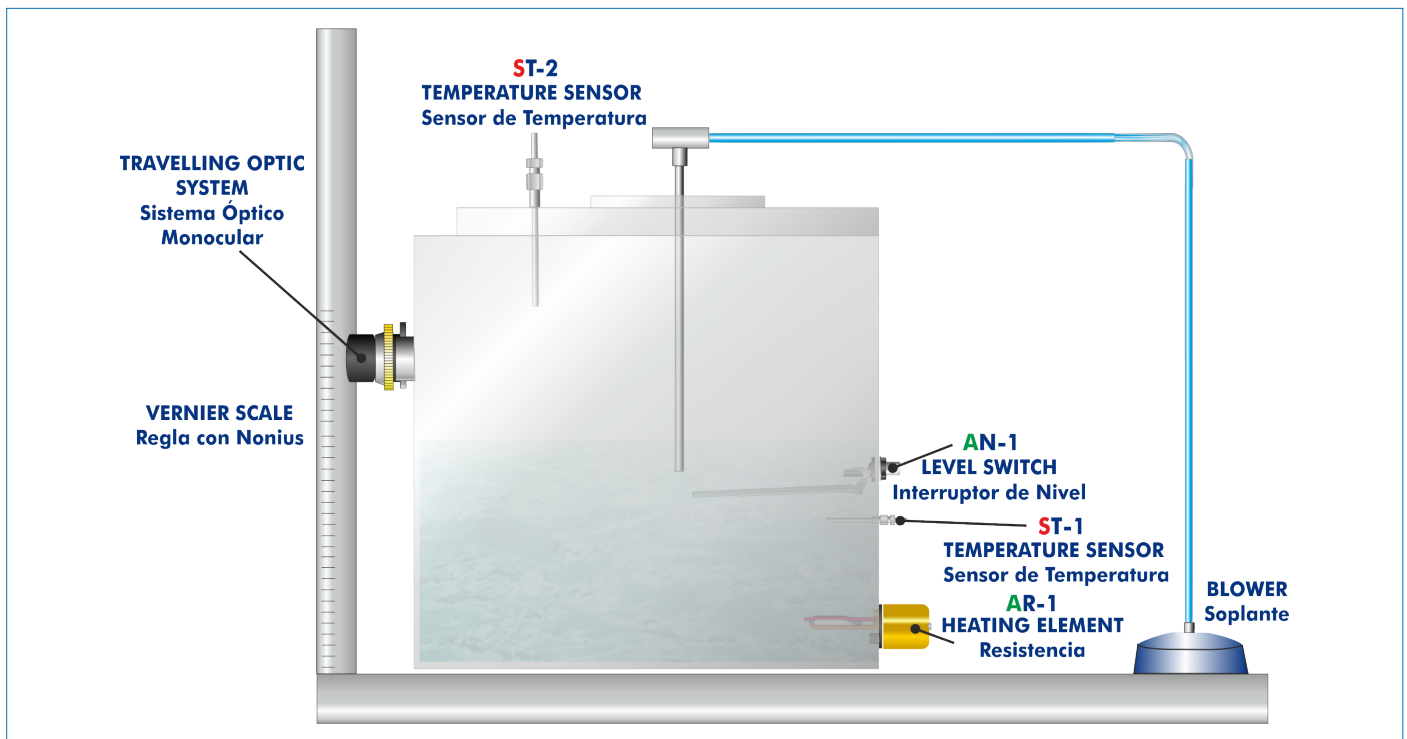




Electronic console

PROCESS DIAGRAM AND UNIT ELEMENTS ALLOCATION



ISO 9001: Quality Management (for Design, Manufacturing, Commercialization and After-sales service)



European Union Certificate (total safety)



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



"Worlddidac Quality Charter" and Platinum Member of Worlddidac

INTRODUCTION

Mass transfer phenomena are common in nature and important in all branches of the engineering. Some examples within the industrial processes are: the removal of polluting materials from the discharge currents of gases and contaminated water, the neutron diffusion inside nuclear reactors, the diffusion of substances to the interior of activated carbon pores, the speed of biological and chemical catalyzed reactions, etc.

The molecular diffusion (or molecular transport) is a mass transfer mode that can be defined as the transfer (or displacement) of individual molecules through a fluid by the disorganized and individual displacements of the molecules, due to concentration differences. Diffusion may take place in stagnant fluids systems or in fluids in motion.

GENERAL DESCRIPTION

The Gaseous Mass Transfer and Diffusion Unit, "QDTG", allows the students to familiarize with the theoretical concepts about mass transfer unit operations, specifically the diffusion of a volatile liquid in an inert gas, obtaining very useful experimental data and results for the good practical understanding of the process and, therefore, for the technical training of the students.

The unit consists of a vertical capillary tube with a volatile solvent (liquid A) and gas (air), which will flow horizontally under laminar flow conditions in the upper end of the tube. This air is introduced by a blower.

The capillary tube is introduced in a controlled temperature thermostatic bath, which will work following the double boiler method. The solvent will be evaporated slowly due to the thermal energy of the bath. And due to the concentration gradient, the gaseous solvent will be dispersed upwards, from the surface of the liquid solvent towards the pure air. The air flow will transport the molecules of the solvent and the volume of the liquid solvent in the tube will be reduced. There is an optical system with fine focusing adjustment to measure this level difference.

SPECIFICATIONS

Bench-top unit.

Anodized aluminum frame and panels made of painted steel.

Main metallic elements made of stainless steel.

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

Glass capillary tube.

Air pump with air regulator, range: 0 – 7 l/min.

Travelling optic system with accurate focus adjustment and mounted for vertical axis movement against a Vernier scale, Vernier range: 0 – 300 mm.

Thermostatically controlled water transparent - sided bath. Capacity: 36 l.

Heating resistance: 500 W (max. temperature 60 °C).

Two temperature sensors, "J" type.

Level switch.

Electronic console:

Metallic box.

Water (water bath) temperature digital controller.

Heating resistance switch.

Blower switch.

Level switch connector.

Temperature sensors connectors.

Digital display for the sample temperature.

Heating resistance connector.

Pump connector.

Main 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.



QDTG detail

EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Fick's law application to calculate the diffusivity.
- 2.- Direct measurement of mass transfer rates.
- 3.- Determination of molar density transfer rate.
- 4.- Study of the effect of temperature on diffusion coefficients.
- 5.- Use of gas laws to calculate concentration differences in terms of partial pressures.
- 6.- Graphic representation of the concentration profiles.
- 7.- Gaining familiarity with the use of laboratory instruments to achieve measurements of data required for industrial process design.

REQUIRED SERVICES

- Electrical supply: single-phase 200 VAC – 240 VAC/50 Hz or 110 VAC – 127 VAC/60 Hz.

DIMENSIONS AND WEIGHTS

QDTG:

Unit:

-Dimensions: 600 x 570 x 570 mm approx.
(23.62 x 22.44 x 22.44 inches approx.)

-Weight: 30 Kg approx.
(66 pounds approx.)

Electronic console:

-Dimensions: 300 x 230 x 135 mm approx.
(11.81 x 9.05 x 5.31 inches approx.)

-Weight: 2 Kg approx.
(4.4 pounds approx.)

REQUIRED CONSUMABLES (Not included)

- Volatile liquid (for example: acetone).

SIMILAR UNITS AVAILABLE

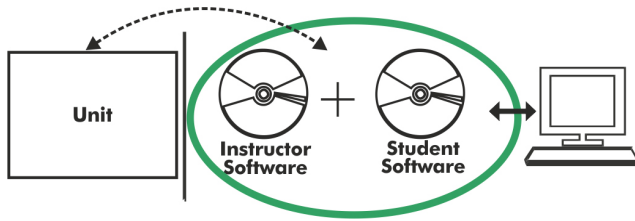
Offered in this catalog:

- QDTG. Gaseous Mass Transfer and Diffusion Unit.

Offered in other catalogs:

- QDTGC. Computer Controlled Gaseous Mass Transfer and Diffusion Unit.
- QDTLC. Computer Controlled Liquid Mass Transfer and Diffusion Unit.
- QDTL. Liquid Mass Transfer and Diffusion Unit.

QDTG/ICAI. Interactive Computer Aided Instruction Software:



With no physical connection between unit and computer, this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF). Both are interconnected so that the teacher knows at any moment what is the theoretical and practical knowledge of the students.

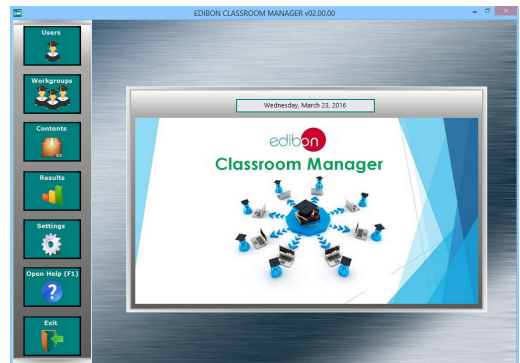
Instructor Software

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).

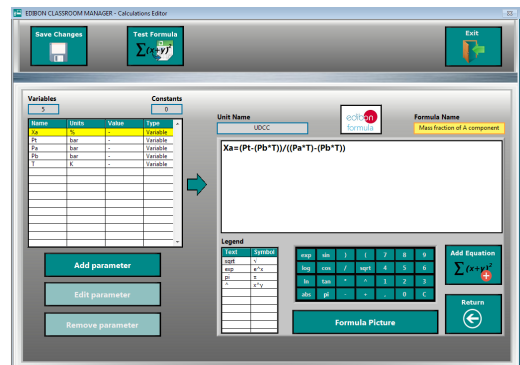
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual students, workgroups, units, etc... so the teacher can know in real time the level of understanding of any student in the classroom.

Innovative features:

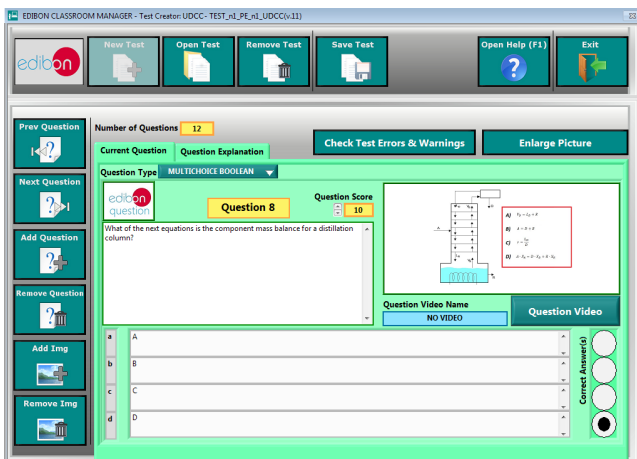
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.
- Updatable Contents.
- Report generation, User Progression Monitoring and Statistics.



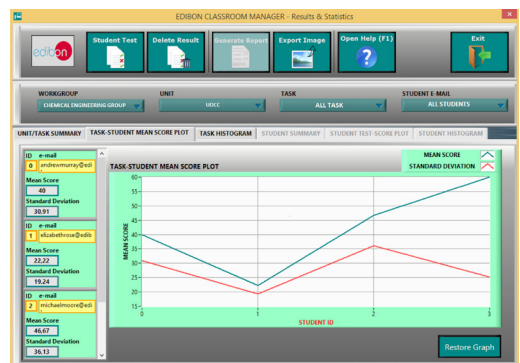
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



ECAL. EDIBON Calculations Program Package - Formula Editor Screen



ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question



ERS. EDIBON Results & Statistics Program Package - Student Scores Histogram

Optional
Student Software

- ESL-SOF. EDIBON Student Labsoft (Student Software).

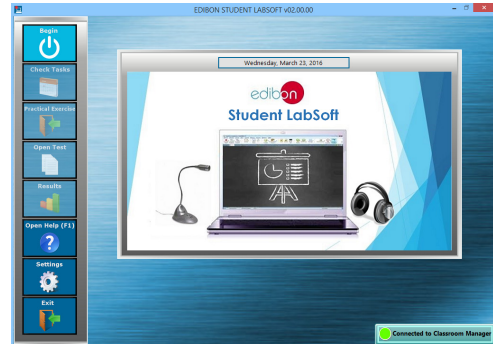
ESL-SOF is the application addressed to the Students that helps them to understand theoretical concepts by means of practical exercises and to prove their knowledge and progression by performing tests and calculations in addition to Multimedia Resources. Default planned tasks and an Open workgroup are provided by EDIBON to allow the students start working from the first session. Reports and statistics are available to know their progression at any time, as well as explanations for every exercise to reinforce the theoretically acquired technical knowledge.

Innovative features:

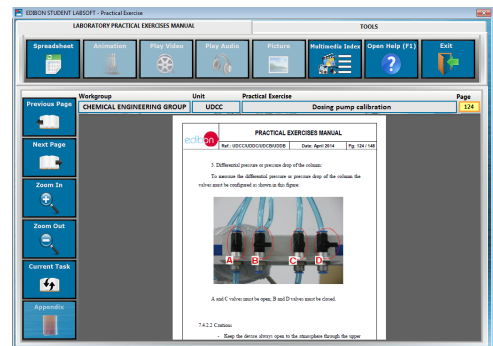
- Student Log-In & Self-Registration.
- Existing Tasks checking & Monitoring.
- Default contents & scheduled tasks available to be used from the first session.
- Practical Exercises accomplishment by following the Manual provided by EDIBON.
- Evaluation Methods to prove your knowledge and progression.
- Test self-correction.
- Calculations computing and plotting.
- Equation System Solver Engine.
- User Monitoring Learning & Printable Reports.
- Multimedia-Supported auxiliary resources.

For more information see ICAI catalogue. Click on the following link:

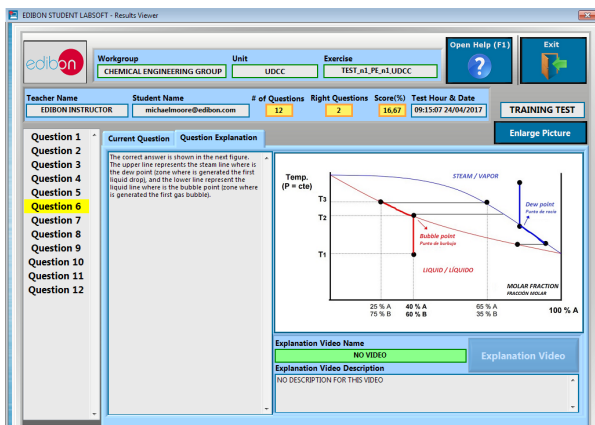
www.edibon.com/en/files/expansion/ICAI/catalog



ESL-SOF. EDIBON Student LabSoft (Student Software) Application Main Screen



EPE. EDIBON Practical Exercise Program Package Main Screen



ERS. EDIBON Results & Statistics Program Package - Question Explanation

Pa (bar)	Pb (bar)	Pc (bar)	(R)	Xa (N)
12	20	5	2	0.17
15	25	12	5	-0.024
6	20	26	15	0.044

ECAL. EDIBON Calculations Program Package Main Screen

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



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REPRESENTATIVE:

