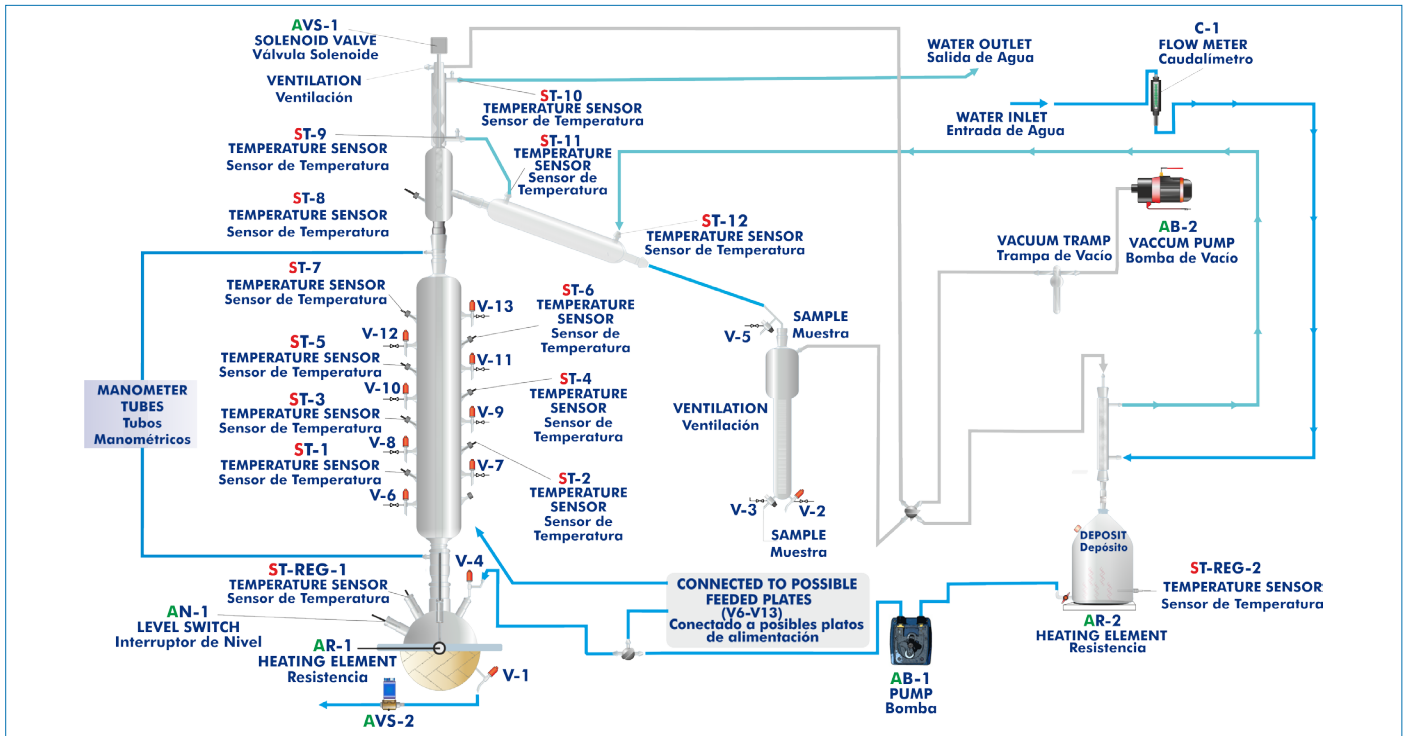




Electronic console

### 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

Distillation is defined as “the separation of a liquid mixture through its partial water vaporization; the water vaporized fraction condenses and it is re-established as a liquid”.

One of the essential requisites to carry out a distillation successfully is that substances to be separated from the liquid solution which contains its mixture have different boiling points. Thus, it will be obtained a vapor rich in the most volatile component and a liquid formed by the less volatile component (or with a lower boiling temperature).

In this way, it can be stated that, through a distillation process, it is possible to separate the components of a liquid mixture by the order of its vapor pressure.

Distillation is applied in almost all the chemical industry and is fundamental in the elaboration of numerous industrial products, although without a doubt it is the petrochemical industry, the industrial area in which the distillation process acquires greater importance.

The Distillation Unit, “UDCB”, designed by EDIBON, is a powerful laboratory tool for the study of variables affecting the distillation process. The student can investigate the principles that govern the transfer of matter and energy, as well as determine the optimum operating point for carrying out a large number of separations.

## GENERAL DESCRIPTION

The Continuous Distillation Unit, “UDCB”, is formed by a boiler, on which different types of columns can be adapted (plate columns and Raschig columns). An eight plate column, a reflux system, a tank for distillation, a vacuum pump and a feeding pump (for continuous feeding) are included.

The steam reaching the head of the column is sent to a total condenser. The cooling water flow going through the condenser can be adjusted and is indicated in a flow meter. Distillation can be carried out at low pressures with the help of an adjustable vacuum pump. The load loss in the column can be measured with a pressure meter.

The column can work both continuously and discontinuously.

For proceeding to continuous feeding, a pump that can inject the substance directly into the boiler or in any of the plates is available.

The temperatures of the system are measured through sensors placed in strategic positions.

## SPECIFICATIONS

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.

Sieve Plates Column with eight plates with samples on each plate and temperature taking (“J” type sensor):

Internal diameter: 50 mm.

Length: 1000 mm.

Vacuumed, silver-plated and double transparent band for vision.

The column can work both continuously and discontinuously.

Column head with temperature taking, conical output for distilled product and ball refrigerator.

Column head with a valve for the steam distribution. The valve operates in an electromagnetic way.

Boiler (with sample outputs) with heating mantle, with maximum adjustable power: 500 W. Capacity: 2 l.

Distillation collector of graduated glass, capacity: 2 l.

Liebig-west coolant.

Feeding system in continuous with preheating (heating resistance) at the specified temperature and a pump that provides a maximum flow of 3.81 l/min.

Feed vessel, capacity: 10 l.

Adjustable vacuum pump that allows to decrease the atmospheric pressure to 0.5 bar.

Temperature measurement system. Twelve temperature sensors (“J” type).

Flow meter.

Manometer tubes.

Working temperature: ambient temperature up to 125 °C.

Solenoid valve.

Electronic Console:

Metallic box.

Temperature sensors connections.

Digital display for temperature sensors.

Selector for temperature sensors.

Heating resistance controller.

Pump switches.

Solenoid valve timer controller. (Solenoid valve reflux time control).

Level switch.

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.

Additional recommended elements (Not included):

- CAR1. Raschig Ring Column.

- C8P1. 8 Plates Type Column (1 Temperature Point).

- C10P10. 10 Plates Type Column (10 Temperature Points).

- C14P14. 14 Plates Type Column (14 Temperature Points).



UDCB detail

## EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Preparation of solutions.
- 2.- Analytic valuation techniques.
- 3.- Filling of the column.
- 4.- Batch operation. Continuous operation.
- 5.- Obtaining the McCabe-Thiele diagram. Without reflux
- 6.- Obtaining the number of plates. Without reflux.
- 7.- Efficiency calculations. Without reflux.
- 8.- Variation of the composition of the distilled product: constant reflux ratio.
- 9.- Constant composition of the distilled product: variation of reflux ratio.
- 10.- Constant composition of the distilled product: constant reflux ratio.
- 11.- Continuous feeding of the column.
- 12.- Mass and energy balances across the system.
- 13.- Plates fluid dynamics studies, including load loss and column flooding.
- 14.- Study of the feed temperature effect on the continuous processes.
- 15.- Calculation of the theoretical number of floors in the plates columns, and the equivalent height of the theoretical floor (HEPT) in the Raschig rings columns.
- 16.- Pursuit of the temperatures in all plates in the column (Plates columns).
- 17.- Study of the rectification efficiency at different pressures.
- 18.- Effect of feed pre-heat.
- 19.- Effect of feed position.
- 20.- Demonstration of azeotropic distillation.
- 21.- Studies of heating interchange in glass refrigerators.

### REQUIRED SERVICES

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

### DIMENSIONS AND WEIGHTS

- UDCB:
- Unit:
- Dimensions: 900 x 600 x 2800 mm approx.  
(35.43 x 23.62 x 110.23 inches approx.)
  - Weight: 200 Kg approx.  
(441 pounds approx.)
- Electronic Console :
- Dimensions: 490 x 450 x 470 mm approx.  
(19.29 x 17.71 x 18.50 inches approx.)
  - Weight: 20 Kg approx.  
(44 pounds approx.)

### ADDITIONAL RECOMMENDED ELEMENTS (Not included)

- CAR1. Raschig Ring Column.
- C8P1. 8 Plates Type Column (1 Temperature Point).
- C10P10. 10 Plates Type Column (10 Temperature Points).
- C14P14. 14 Plates Type Column (14 Temperature Points).

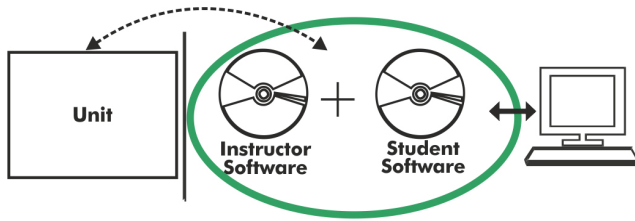
### RECOMMENDED CONSUMABLES (Not included)

- Water/Methanol.
- Heptane/Methylcyclohexane.
- P-Xylene/Methylcyclohexane.

### SIMILAR UNITS AVAILABLE

- Offered in this catalog:
- UDCB. Continuous Distillation Unit.
- Offered in other catalogs:
- UDCC. Computer Controlled Continuous Distillation Unit.
  - UDDC. Computer Controlled Batch Distillation Unit.
  - UDDB. Batch Distillation Unit.

**UDCB/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.

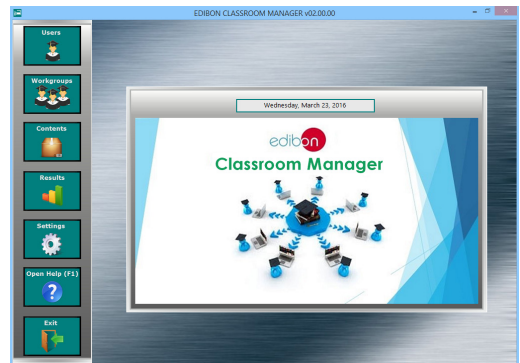
Instructor Software

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

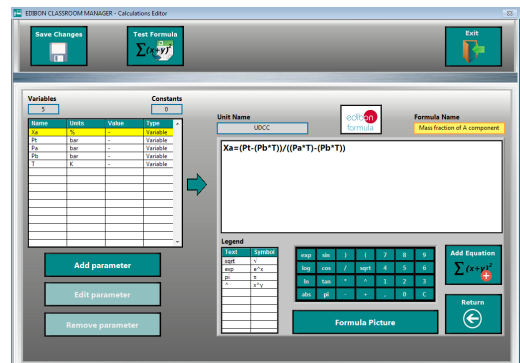
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

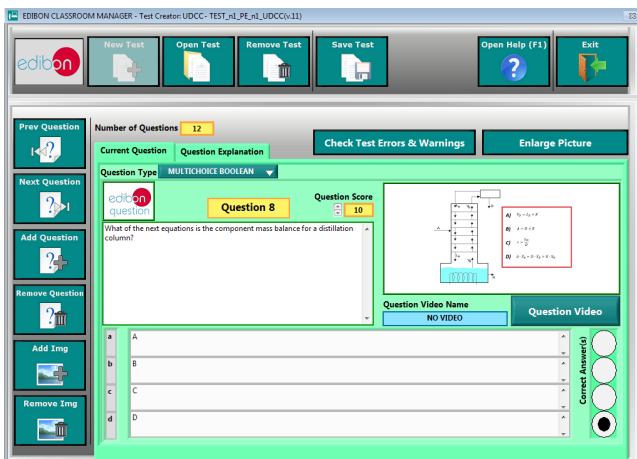
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.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



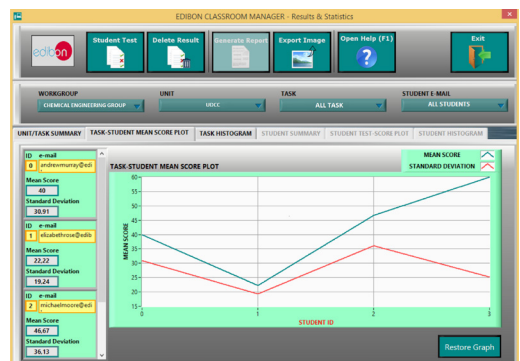
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



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).

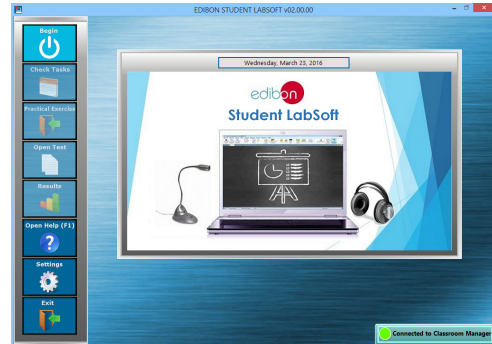
ESL-SOF is the application addressed to the Students that helps them to understand theoretical concepts by means of practical exercises and to prove their knowledge and progression by performing tests and calculations in addition to Multimedia Resources. Default planned tasks and an Open workgroup are 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:

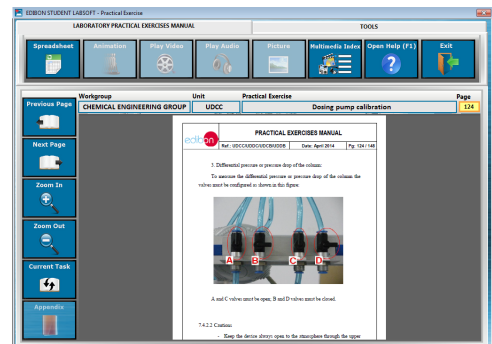
- Student Log-In & Self-Registration.
- Existing Tasks checking & Monitoring.
- Default contents & scheduled tasks available to be used from the first session.
- Practical Exercises accomplishment by following the Manual provided by EDIBON.
- Evaluation Methods to prove your knowledge and progression.
- 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:

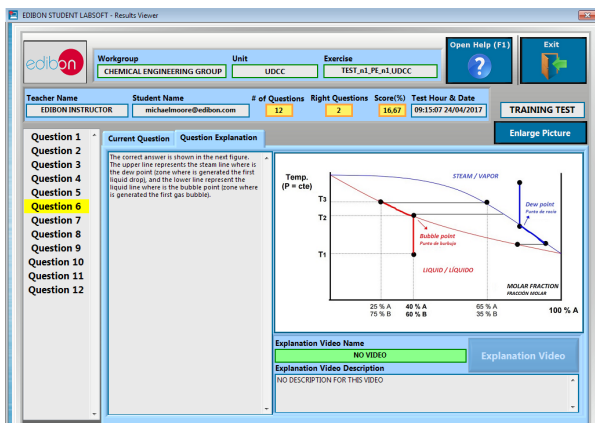
[www.edibon.com/en/files/expansion/ICAI/catalog](http://www.edibon.com/en/files/expansion/ICAI/catalog)



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

F1 (bar)	F2 (bar)	F3 (bar)	F4 (bar)	X1 (bar)
20	20	20	20	20
15	20	20	20	20
5	20	20	20	20

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:

