Batch Distillation Unit

UDDB

Electronic console

PROCESS DIAGRAM AND UNIT ELEMENTS ALLOCATION

ST-12
TEMPERATURE SENSOR
Sensor de Temperatura

VENTILATION
Ventilación

AVS-1
SOLENOID VALVE
Válvula Solenoide

REFLUX CONTROL
Control de Reflujo

WATER OUTLET
Salida de Agua

ST-11
TEMPERATURE SENSOR
Sensor de Temperatura

ST-14
TEMPERATURE SENSOR
Sensor de Temperatura

OPTIONAL

ST-2
TEMPERATURE SENSOR
Sensor de Temperatura

ST-10
TEMPERATURE SENSOR
Sensor de Temperatura

ST-3
TEMPERATURE SENSOR
Sensor de Temperatura

AV-13
ST-8
AV-11
ST-6
AV-9
ST-4
AV-7
ST-2

ST-9
AV-12
ST-7
AV-10

ST-13
TEMPERATURE
SENSOR
Sensor de
Temperatura

C-1
FLOW METER
Caudalímetro

ST-4
TEMPERATURE SENSOR
Sensor de Temperatura

SPD-1
DIFFERENTIAL
PRESSURE SENSOR
Sensor de Presión
Diferencial

ST-5
TEMPERATURE
SENSOR
Sensor de
Temperatura

SAMPLE
Muestra

ST-6
TEMPERATURE SENSOR
Sensor de Temperatura

AV-8
AV-5
ST-3
AV-6

VENTILATION
Ventilación

ST-7
TEMPERATURE SENSOR
Sensor de Temperatura

WATER INLET
Entrada de Agua

ST-8
TEMPERATURE SENSOR
Sensor de Temperatura

ST-1
TEMPERATURE SENSOR
Sensor de Temperatura

AV-4

AV-3
V-2

ST-9
TEMPERATURE SENSOR
Sensor de Temperatura

SAMPLE
Muestra

AR-1
HEATING ELEMENT
Resistencia

AV-1

SAMPLE
Muestra

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 sucessfully 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 Batch Distillation Unit, "UDDB", 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 Batch Distillation Unit, "UDDB", is basically composed by a boiler on which different types of interchangeable columns can be adapted (plate columns and Raschig Rings column). An eight plate column, a reflux system and a tank for the distillation are included.

The steam that goes to the head of the column is sent to a total condenser. The cooling water flow that crosses the condenser is regulated and indicated in a flow meter.

The pressure loss in the column can be measured with a manometer.

The temperatures of the system are measured by temperature 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 one temperature taking and sample:

    Internal diameter: 50 mm.

    Length: 1000 mm.

    Vacuumed, silverplated and double transparent band for vision.

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

Column head with a valve for the steam distribution.

Boiler (with sample outputs) with heating mantle, capacity: 2 l.

Distillation collector of graduated glass, capacity: 2 l.

Refrigerator.

Temperature measurement system.

Seven "J" type temperature sensors.

Working temperature: ambient temperature up to 125 °C.

Flow meter, range: 0.2 – 2 l/min.

Manometer tubes.

Solenoid valve.

Electronic console:

    Metallic box.

    Temperature sensors connections.

    Digital display for temperature sensors.

    Selector for temperature sensors.

    Heating element temperature control.

    Solenoid valve switch.

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

    Main switch.

Cables and Accessories, for normal operation.

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

UDDB detail

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).

EXERCISES AND PRACTICAL POSSIBILITIES

1.- Preparation of solutions.

2 .- Analytic valuation techniques.

3 .- Filling of the column.

4 .- Batch 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.-Mass and energy balances across the system.

12.-Plates fluid dynamics studies, including load loss and column flooding.

13.-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.

14.-Pursuit of the temperatures in all plates in the column (Plates columns).

15.-Study of the rectification efficiency.

16.-Demonstration of azeotropic distillation.

17.-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

UDDB:

Unit:

-Dimensions: 900 x 600 x 2600 mm approx.

(35.43 x 23.62 x 102.36 inches approx.)

-Weight: 170 Kg approx.

(375 pounds approx.)

Electronic console:

-Dimensions: 490 x 330 x 310 mm approx.

(19.29 x 12.99 x 12.20 inches approx.)

-Weight: 12 Kg approx.

(26.45 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:

-UDDB. Batch Distillation Unit.

Offered in other catalogs:

-UDDC. Computer Controlled Batch Distillation Unit.

-UDCC. Computer Controlled Continuous Distillation Unit.

-UDCB. Continuous Distillation Unit.

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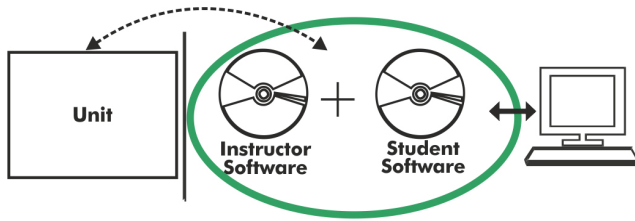
With no physical connection between unit and computer, **this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF).** Both are interconnected so that the teacher knows at any moment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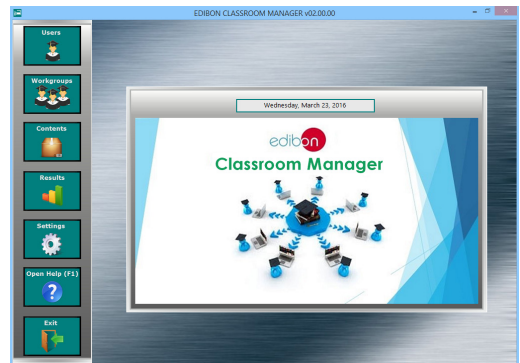
Instructor Software

- 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.

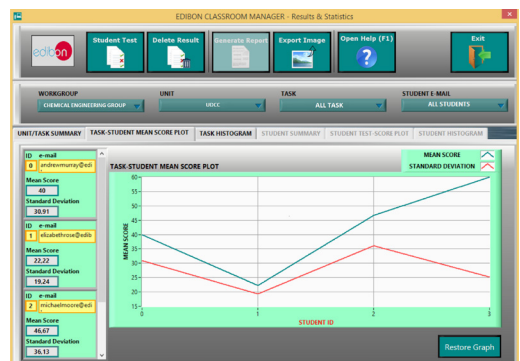• Report generation, User Progression Monitoring and Statistics.

ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen
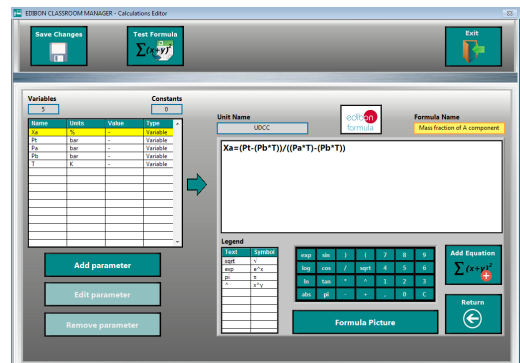
ECAL. EDIBON Calculations Program Package - Formula Editor Screen
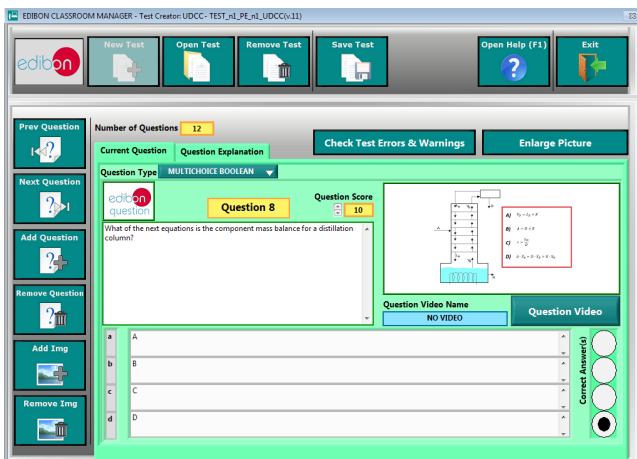
ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question

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

www.edibon.com

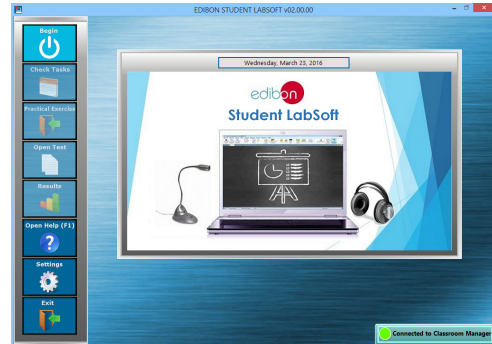## - ESL-SOF. EDIBON Student Labsoft (Student Software).

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.

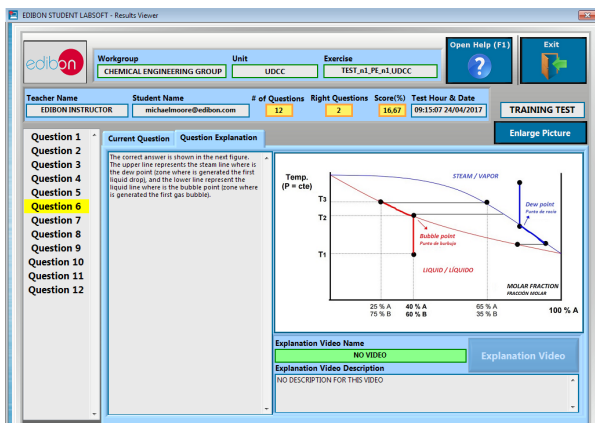For more information see ICAI catalogue. Click on the following link:

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

ESL-SOF. EDIBON Student LabSoft (Student Software)
Application Main Screen
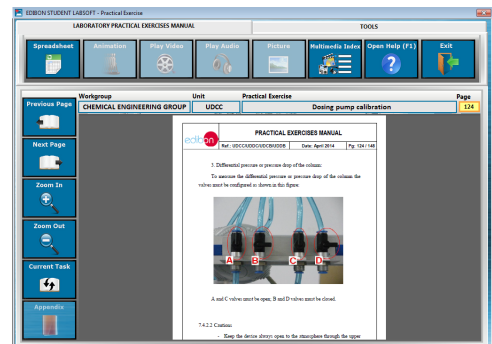
EPE. EDIBON Practical Exercise Program Package Main Screen

ERS. EDIBON Results & Statistics Program Package - Question Explanation

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: