Fixed and Fluidised Bed Unit

LFF

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⮫PRODUCTS
⮫11.-CHEMICAL
ENGINEERING

edibon

Engineering and Technical
Teaching Equipment

PROCESS DIAGRAM AND UNIT ELEMENTS ALLOCATION
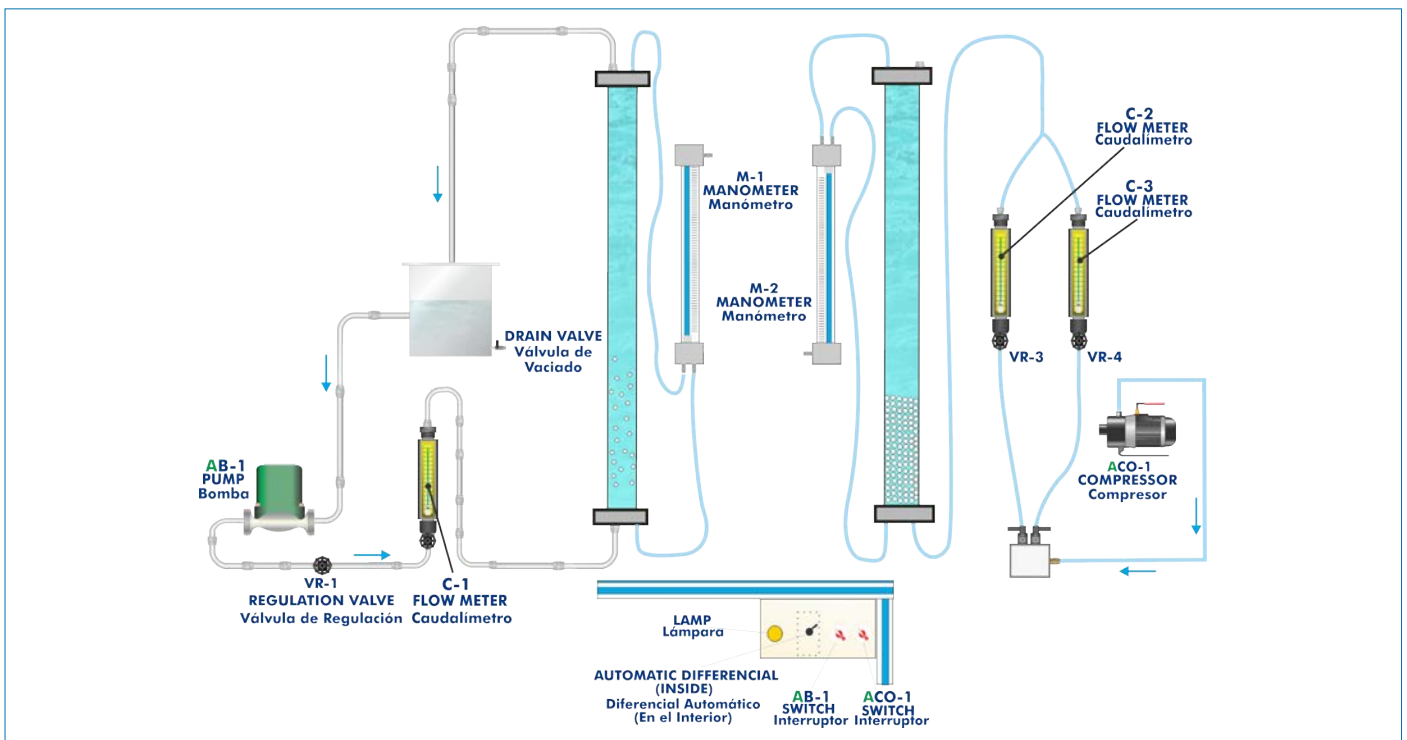
C-2
FLOW METER
Caudalímetro

C-3
FLOW METER
Caudalímetro

M-1
MANOMETER
Manómetro

M-2
MANOMETER
Manómetro

VR-3   VR-4

DRAIN VALVE
Válvula de
Vaciado

ACO-1
COMPRESSOR
Compresor

AB-1
PUMP
Bomba

VR-1
REGULATION VALVE
Válvula de Regulación

C-1
FLOW METER
Caudalímetro

LAMP
Lámpara

AUTOMATIC DIFFERENCIAL
(INSIDE)
Diferencial Automático
(En el Interior)

AB-1
SWITCH
Interruptor

ACO-1
SWITCH
Interruptor

INTRODUCTION

The flow of a fluid through a particles bed is a phenomenon that normally takes place in many situations in the nature; as for example, the flow of water through the ground.

As far as industrial applications are concerned, fluidization is a process that takes part in ion exchange processes, extraction of soluble compounds from raw materials and other chemical processes.

GENERAL DESCRIPTION

The Fixed and Fluidised Bed Unit, "LFF", allows a full study about everything concerning the flow of a fluid through a particles bed, both fixed and fluidised.

The unit is composed of two transparent removable columns for the simultaneous study of the air and water flow through the bed.

In the Fixed and Fluidised Bed Unit, "LFF", each column is connected to a manometers panel, which indicates at all times the pressure drop caused by the bed.

Water is pumped from a tank, located at the back side of the unit, to the bottom of the first column, passing through a flow control valve and a flow meter.

Air is supplied to the second column through a compressor located at the back of the unit. The air flow is measured by a flow meter.

There are glass beads of two different sizes for the bed.

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.

Two transparent cylindrical columns, one for air and one for water. Each column:

- Diameter: 50 mm.
- Height: 550 mm.
- Bed plates.

Two sizes of bed material (glass beads) are supplied:

- 170/300 micron.
- 250/420 micron.

The columns can be dismantled in order to remove the particle bed.

Water tank of 10 l capacity.

Water pump.

Compressor.

Water regulation valve and water flow meter, range: 0.07 – 0.55 l/min.

Two air regulation valves and two air flow meters, ranges: 3 – 21 l/min and 1 – 7.5 l/min.

Two pressure meters (manometers).

Electrical panel:

Lamp.

Compressor switch.

Pump 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

1.- Study of the basis of fixed bed fluidization.

2.- Comparison of the fluidization process in water and air currents.

3.- Study of the pressure drop through fixed and fluidised beds in function of:

  The flow speed.

  The size of the bed particles.

  Type of fluid: air or water.

4.- Verification of Carman-Kozeny equation.

5.- Study and determination of the minimum fluidization speed.

6.- Study and determination of the fluidization speed and comparison with theoretical calculated values (Ergun equation).

7.- Study of differences between particulate and aggregative fluidization.

8.- Observation of the "bubbling" fluidization phenomenon.

REQUIRED SERVICES

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

DIMENSIONS AND WEIGHTS

LFF:

  -Dimensions: 700 x 570 x 870 mm approx.

    (27.55 x 22.44 x 34.25 inches approx.)

  -Weight: 50 Kg approx.

    (110 pounds approx.)

AVAILABLE VERSIONS

Offered in this catalogue:

- LFF. Fixed and Fluidised Bed Unit.

Offered in other catalogue:

- LFFC. Computer Controlled Fixed and Fluidised Bed Unit.

LFF/ICAI. Interactive Computer Aided Instruction Software System:

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.
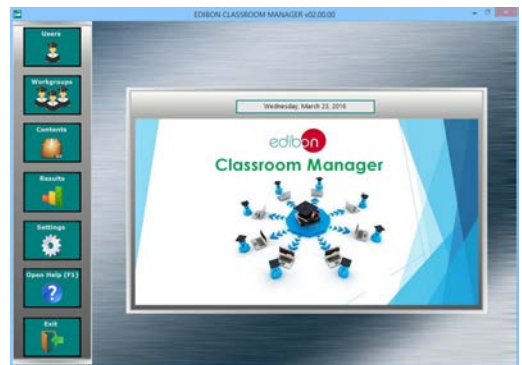
Instructor Software

### - 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
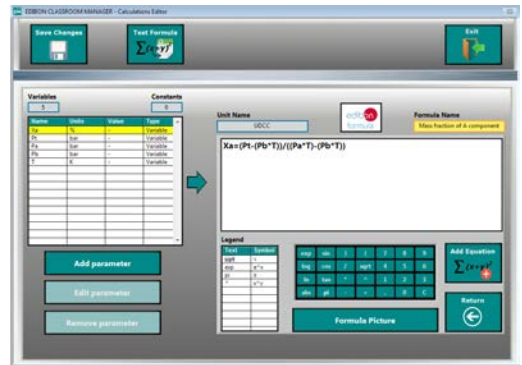
ECAL. EDIBON Calculations Program Package - Formula Editor Screen
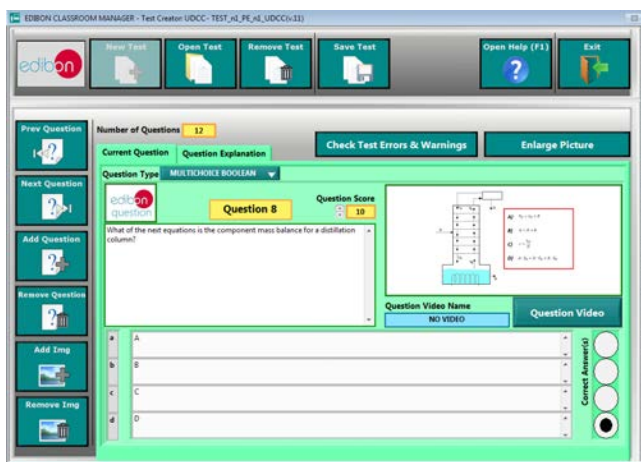
ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question

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

- 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.

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

EPE. EDIBON Practical Exercise Program Package Main Screen

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

www.edibon.com/en/files/expansion/ICAI/catalog
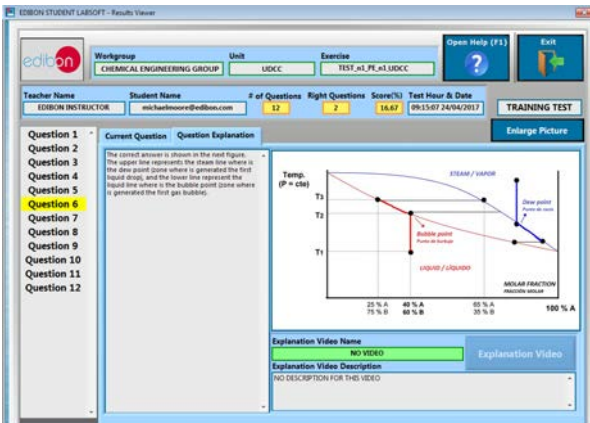
ERS. EDIBON Results & Statistics Program Package - Question Explanation

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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