

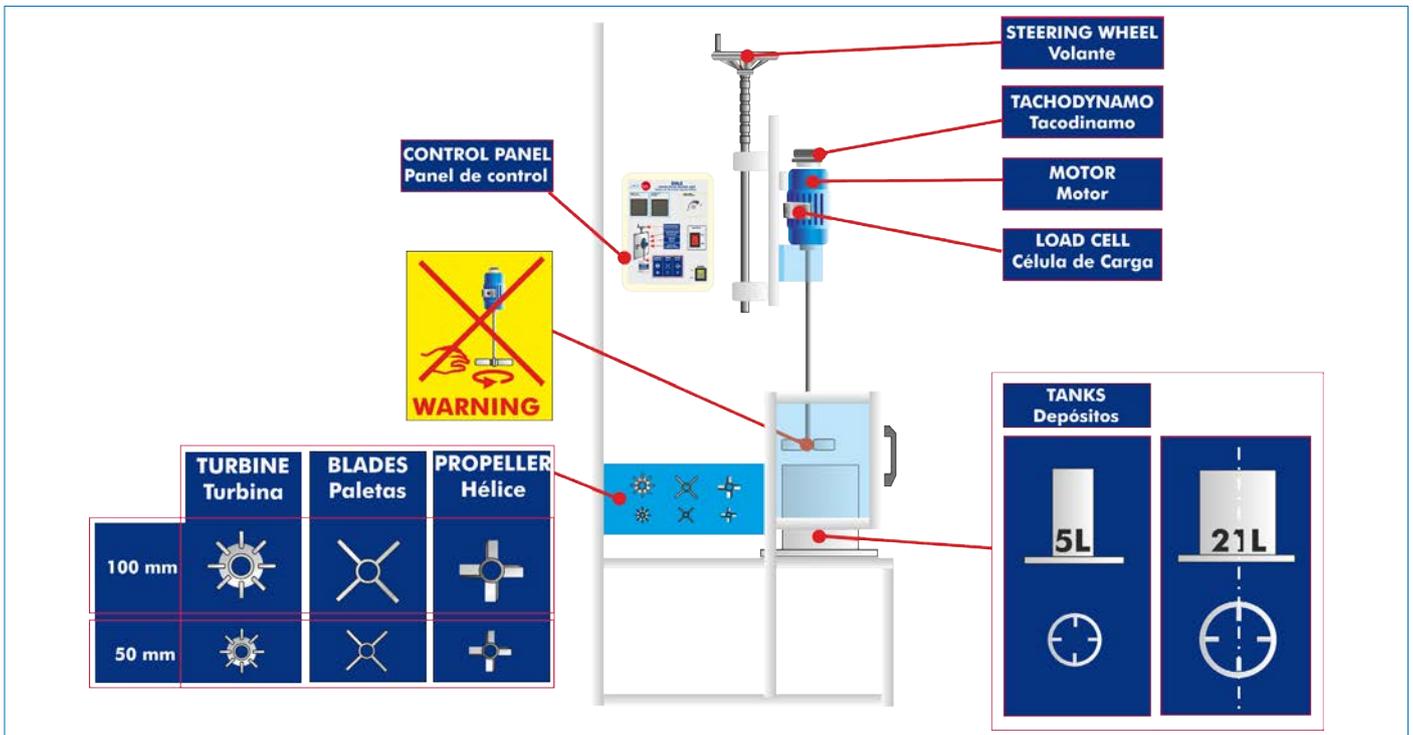


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 Products  
 Products range  
 Units  
 11.- Chemical Engineering

Control Panel in detail



**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)



Certificate and Worlddidac Member

## INTRODUCTION

Agitation is a unit operation whose objective is to produce irregular movements in a fluid, by mechanical devices that act on it. Agitation is often mistaken with mixture, but they are not synonyms. Agitation refers to the movement induced in a material in a specific form, generally with a circulatory model inside some type of container and a mixture, however, is a random distribution of two or more phases initially separated. An only material, as water in a tank, can never be mixed. To make it, it will be necessary to introduce water at another temperature or another type of solid powdery material.

The Liquid/Solid Mixing Unit "EMLS" allows the study of the agitation process in order to familiarize the student with the different magnitudes (torque, turning speed, etc) that takes part in the process.

## GENERAL DESCRIPTION

The Liquid/Solid Mixing Unit "EMLS" is made up of a main support frame, in which a dynamo brake motor of adjustable speed and mechanical connections are installed. Diverse types of agitators can be coupled to the motor.

The motor with the above elements can be vertically displaced to locate the agitator at different heights. The mechanical system required to move the motor is made up of a platform that slides along two guides using a spindle and a steering wheel.

To be able to carry out the tests, the unit includes different types of agitators of different size.

The tanks are made of a transparent material to facilitate the observation of the mixing process. There covers to avoid splashes.

The Liquid/Solid Mixing Unit "EMLS" has different safety elements to avoid accidents. These elements disconnect the unit when the door is open or the agitator is up.

## SPECIFICATIONS

Metallic frame and panels made of painted steel.

Main metallic elements of stainless steel.

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

The unit includes wheels for its mobility.

Dynamo brake motor, with speed regulation:

Its purpose is to make the agitator turn at preset revolutions value.

Power: 0.37 kW. Revolutions: from 0 to 3000 rpm.

Torque meter (load cell):

Its objective is to measure the torque established between the motor and the solution.

Crowbar: 18.3 cm.

Force range: 0 to 39.2 N.

Vertical platform:

It allows to displace the dynamo brake motor vertically. It is operated by a spindle and a steering wheel and its displacement is guided by lineal bearings.

Agitators holder:

It is the element that allows to install different types of agitators. They are coupled with clamps.

Agitators:

They are the elements in charge of the agitation of the fluid, and they can be of different shapes and sizes:

Two blades agitators, diameters: 100 mm. and 50 mm.

Two propeller agitators, diameters: 100 mm. and 50 mm.

Two turbine agitators, diameters: 100 mm. and 50 mm.

The propeller agitators are used for mixing with viscosity higher than 2000 cp.

Tanks:

Their purpose is to contain the fluid that we will use in the experiment. They are cylindrical and are made of transparent material, to facilitate the observation of the stage of agitation in the fluid. They have removable covers to avoid spills and splashes of the fluid.

Tank of 300 mm diameter and 300 mm height, with deflectors.

Tank of 300 mm diameter and 300 mm height, without deflectors.

Tank of 150 mm diameter and 300 mm height, with deflectors.

Tank of 150 mm diameter and 300 mm height, without deflectors.

The capacity of the tanks is approximately 21 and 5 l.

Control panel:

ON/OFF motor switch, speed controller and speed display.

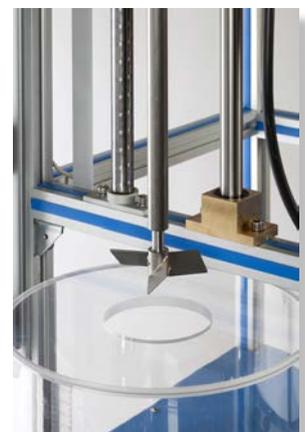
Torque display.

Cables and accessories, for normal operation.

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



The panel with the different types of agitators



Unit detail

## EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Visualization of fluid fields.
- 2.- Power required in the agitation process.
- 3.- Suspensions of solids in liquids.
- 4.- Formation of solid-liquid solutions.
- 5.- Emulsion of immiscible liquids.
- 6.- Mixing of miscible liquids.
- 7.- Heating process of liquid mass.
- 8.- Test with models at scale.
- 9.- Quality of mixing / mixing time.
- 10.- Power and speed of the different agitators.
- 11.- Demonstration of the different factors (tanks, deflectors, agitators...), that affect the mixing, using visualization techniques and appropriate measurement.

### REQUIRED SERVICES

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

### DIMENSIONS AND WEIGHT

- Dimensions: 700 x 910 x 1940 mm. approx.  
(27.56 x 35.83 x 76.38 inches approx.)
- Weight: 95 Kg. approx.  
(209.4 pounds approx.)

### REQUIRED ACCESSORIES (Not included)

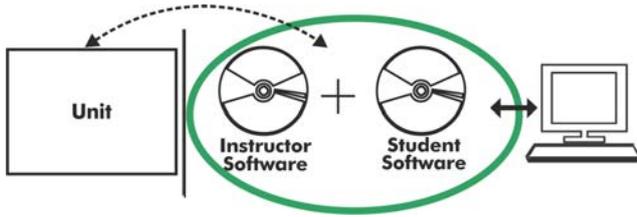
- Heating element.
- Thermometer from 0° to 100°C.
- Vertical and horizontal level.

### RECOMMENDED CONSUMABLES (Not included)

- Clean water.
- Glycerine.
- Fine sand.
- Mineral oil.
- Particles of P.V.C. Size 10 mm.
- Fine grain salt.

## Optional

### EMLS/ICAI. Interactive Computer Aided Instruction Software System:



With no physical connection between unit and computer (PC), 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 Workgroups, Tasks and Training sessions.**

**Creation and Integration of Practical Exercises and Multimedia Resources.**

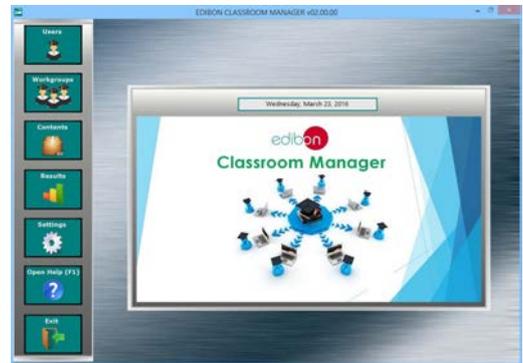
**Custom Design of Evaluation Methods.**

**Creation and assignment of Formulas & Equations.**

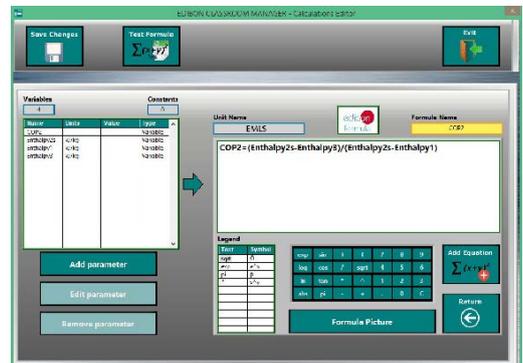
**Equation System Solver Engine.**

**Updatable Contents.**

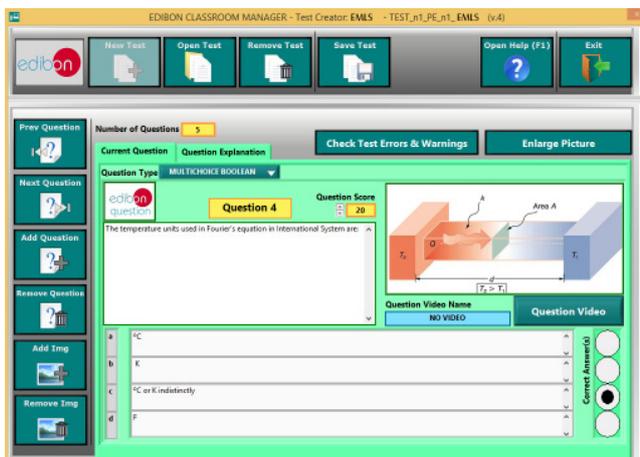
**Report generation, User Progression Monitoring and Statistics.**



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.

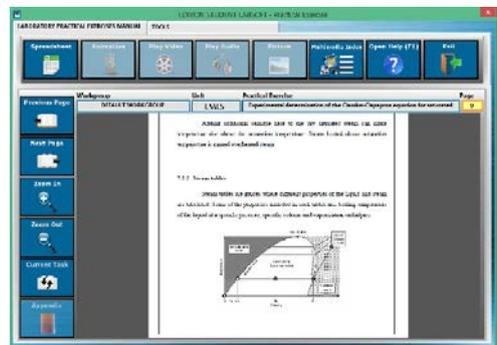
Innovative features:

- 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.**

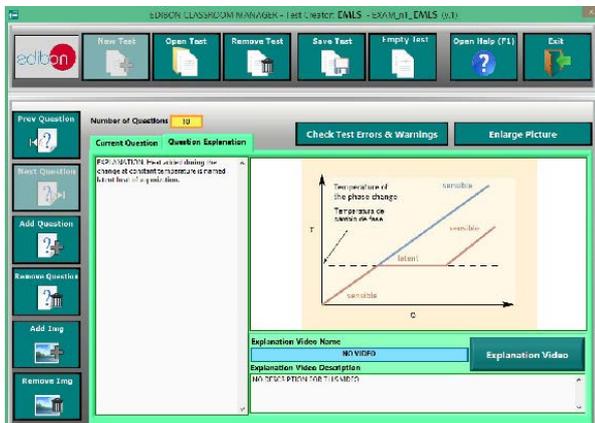
For more information see ICAI catalogue. Click on the following link:  
[www.edibon.com/products/catalogues/en/ICAI.pdf](http://www.edibon.com/products/catalogues/en/ICAI.pdf)



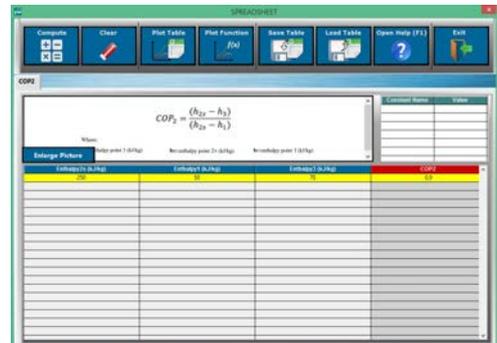
ESL-SOF. EDIBON Student LabSoft (Student Software) Application Main Screen



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:

