



The panel with the different types of agitators

Control panel in detail



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### INTRODUCTION

Agitation is an 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 the mixture, however, is a distribution at random 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.

### GENERAL DESCRIPTION

The EMLS has been designed to demonstrate the factors affecting mixing using visualization and measurement techniques as appropriate. This unit allows the study of the agitation process in order to familiarize the student with the different magnitudes (torque, turning speed, etc) that take part in the process.

It is made up of a main support frame, in which an adjustable speed motor and mechanical connections are installed. We will be able to install diverse types of agitators.

The motor with the above mentioned elements can be vertically displaced to place the agitator at different heights. The mechanical system required to move the motor is made up of a platform that slides along guides through a shaft, triggered using a steering wheel.

To be able to carry out all the test, the unit includes different types of agitators (paddle, propeller, turbine) of different sizes.

The different sized tanks are made of a transparent material to make the observation of the mixing easy. Furthermore, they have removable covers to avoid spillages.

This unit has different safety elements that allow us to avoid accidents. These elements disconnect the unit when the door is open or the agitator is up.



**ISO 9000: Quality Management**  
(for Design, Manufacturing, Commercialization and After-sales service)



**European Union Certificate**  
(total safety)

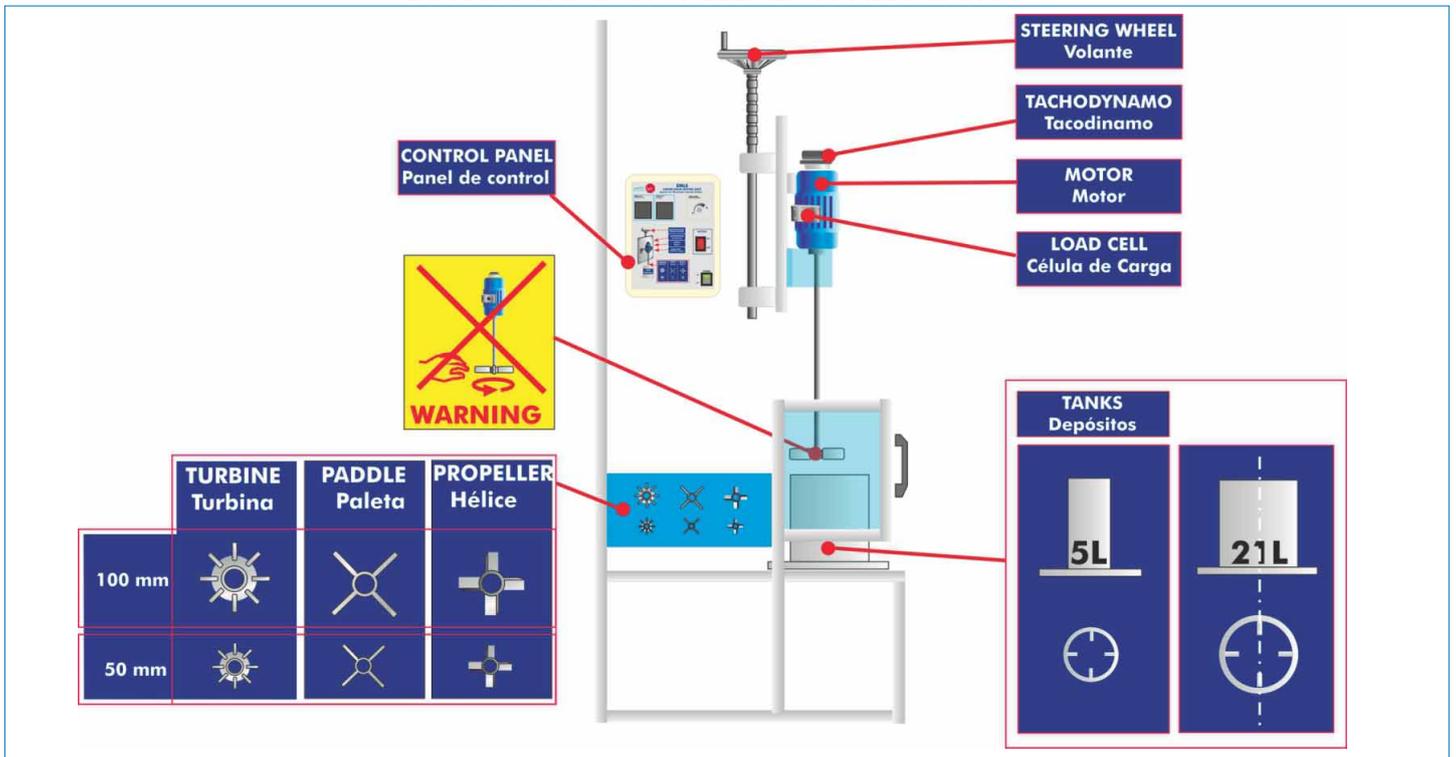


**Certificates ISO 14000 and ECO-Management and Audit Scheme**  
(environmental management)



**Worlddidac Quality Charter Certificate**  
(Worlddidac Member)

## DIAGRAM AND UNIT ELEMENTS ALLOCATION



## SPECIFICATIONS

Metallic frame and panels made of painted steel.

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

Brake Dynamo Motor, with speed regulation:

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

Power: 0.37 kW. Power supply: single-phase AC at 220 V. Revolutions: from 0 to 3000 rpm.

Torque meter (load cell):

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

Crowbar : 18.3 cm.

Force range: 0 to 39.2 N.

Vertical platform:

It allows to displace the brake dynamo motor vertically. It is operated by a steering wheel and displacement 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:

Paddle, diameter: 100 mm. and paddle, diameter: 50 mm.

Propeller, diameter: 100 mm. propeller, diameter: 50 mm.

Turbine, diameter: 100 mm. and turbine, diameter: 50 mm.

The propeller agitators are used for mixing with a viscosity superior to 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.

The unit includes wheels for mobility.

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.

## EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Visualization of fluid fields.
- 2.- Power required in the agitation process.
- 3.- Suspensions of solid in liquids.
- 4.- Formation of solids-liquids 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 speed of the different impellers.
- 11.- Demonstration of the different factors (deposits, 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 & 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.)

### ACCESSORIES & CONSUMABLES

- Clean water.
- Glycerine.
- Fine sand.
- Mineral oil.
- Partides of P.V.C. Size 10 mm.
- Fine grain salt.
- Heating element.
- Thermometer from 0° to 100°C.
- Vertical and horizontal level.

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



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