EDIBON - Engineering and Technical Teaching Equipment

# Rainfall Hydrographs Unit

**RHU**

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↳PRODUCTS
  ↳13.-ENVIRONMENT


Electronic console

## PROCESS DIAGRAM AND UNIT ELEMENTS ALLOCATION



C- **FLOWMETER** Caudalímetro
AVS- **SOLENOID VALVE** Válvula Solenoide
VR- **REGULATION VALVE** Válvula de Regulación
V- **VALVE** Válvula
AM- **MOTOR** Motor

VR-1
V-1
V-2
C-1
V-5
AVS-1
V-4
V-3
AM-1
**WATER INLET** Entrada de Agua
**WATER OUTLET** Salida de Agua
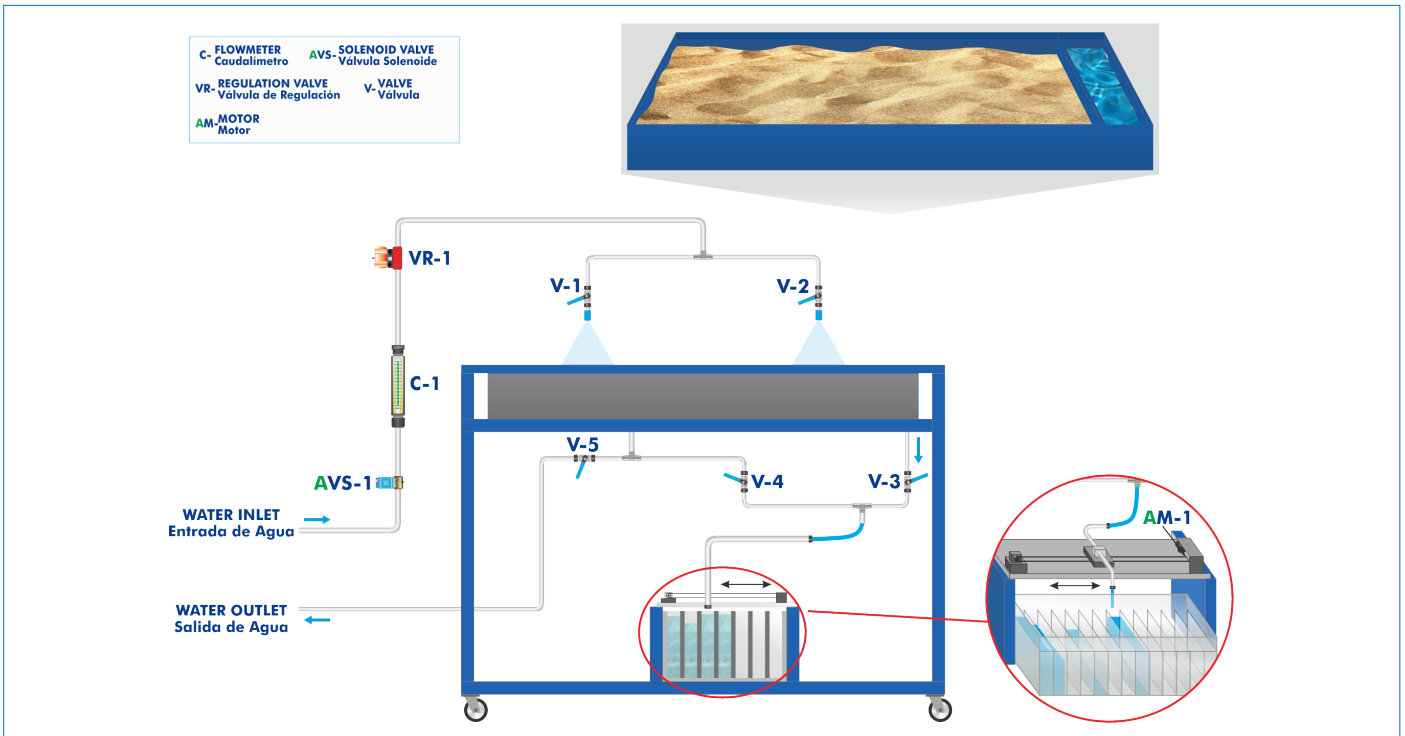
**ISO 9001: Quality Management** (for Design, Manufacturing, Commercialization and After-sales service)

**European Union Certificate** (total safety)

**Certificates ISO 14001 and ECO-Management and Audit Scheme** (environmental management)

**"Worlddidac Quality Charter"** and Platinum Member of Worlddidac

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## INTRODUCTION

The Rainfall Hydrographs Unit, "RHU", is a self-contained unit designed to demonstrate some of the physical processes found in hydrology and fluvial geomorphology, such as rainfall hydrographs for variable permeability catchment areas, dewatering groundwater using drainages, with or without surface recharge by rain, etc.

The unit allows for demonstrating, on a small scale, the hydrological principles of groundwater flow and their applications on some engineering constructions.

Besides, it allows for studying the use of drainages to extract water, dewater and drain lakes and demonstrating the flooding risks related to land drainage.

## GENERAL DESCRIPTION

The main element of the Rainfall Hydrographs Unit,"RHU", is a tank mounted on a frame. The tank can be filled with sand. There are removable curtains to prevent splashing.

There are two square pattern spray nozzles at the top that supply water to the sand. Water, before being sprayed, passes through a flow control valve, a flowmeter and a solenoid valve controlled with the electronic console.

The drainage of the system is driven towards one end of the tank, through which water leaves towards a collection and measurement system, mounted on another frame. The collection system consists of a vessel divided internally into 17 storage compartments and a central drainage channel. Its frame includes a drive motor that allows its displacement to a controlled velocity under the tank outlet, thus enabling an immediate visualization of the hydrograph. The motion time of the system is measured and visualized in the console to be able to obtain an immediate hydrograph of the drainage in function of time.

The unit includes several accessories to analyze the surface retention, the storage effect in depressions and land drainage.

## SPECIFICATIONS

Anodized aluminum frame and panels made of painted steel.

The unit includes wheels to facilitate its mobility.

Main metallic elements made of stainless steel.

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

Tank. Dimensions: 1200 x 820 x 210 mm.

Control valve.

Solenoid valve.

Flowmeter, range: 0.5 – 5 l/min.

Two individually adjustable square pattern spray nozzles.

Height adjustable overflow.

Separable exit chamber with mesh screen.

Drainage system:

    Vessel divided internally into seventeen storage compartments of 0.9 l each.

    Central drainage channel.

    Drive motor.

Accessories:

    Polyethylene sheet for impermeable catchment.

    Four plastic vessels for reservoir storage.

    Drainage line pipe.

Electronic console:

    3.5" touch screen which allows:

        Control of the measurement time for each compartment.

        Rainwater control.

        Display of delay time.

    Main switch.
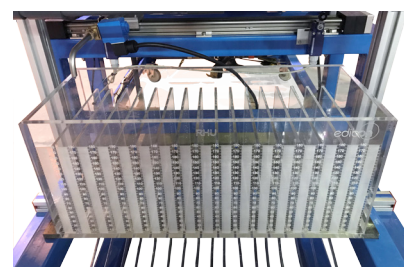
Cables and accessories, for normal operation.

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

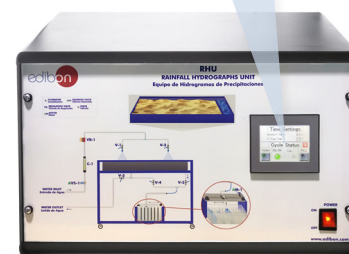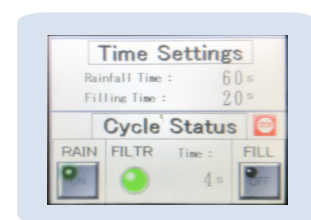<u>Required elements (only one)</u> (Not included):

- FME00. Hydraulics Bench.

        or

- FME00/B. Basic Hydraulic Feed System.



RHU detail



RHU control

## EXERCISES AND PRACTICAL POSSIBILITIES

1.- Recording of hydrographs.

2.- Study of hydrographs from one or more storms.

3.- Calculation of the concentration time for a short storm.

4.- Study of storm hydrographs from a variable permeability catchment area.

5.- Study of storm hydrographs from an impermeable catchment area.

6.- Analysis of the influence of a moving storm on a flood hydrograph.

7.- Analysis of the influence of reservoir storage on a flood hydrograph.

8.- Analysis of the influence of land drains on a flood hydrograph.

## 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

RHU:

Unit:

-Dimensions: 1500 x 1000 x 1000 mm approx.

(59.05 x 39.36 x 39.36 inches approx.)

-Weight: 180 Kg approx.

(396 pounds approx.).

Electronic console:

-Dimensions: 490 x 330 x 310 mm approx.

(19.29 x 12.99 x 12.20 inches approx.)
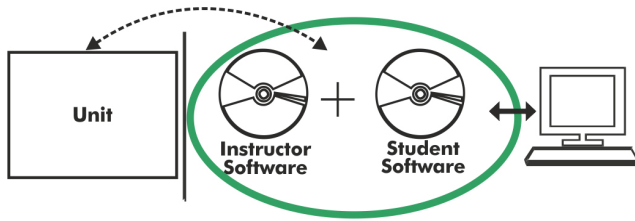
-Weight: 10 Kg approx.

(22 pounds approx.).

## REQUIRED ELEMENTS (Not included)

Required (only one):
- FME00. Hydraulics Bench.

or
- FME00/B. Basic Hydraulic Feed System.

## REQUIRED CONSUMABLES (Not included)

- Sand, with a grain diameter between 2 mm and 4 mm.

## RHU/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.
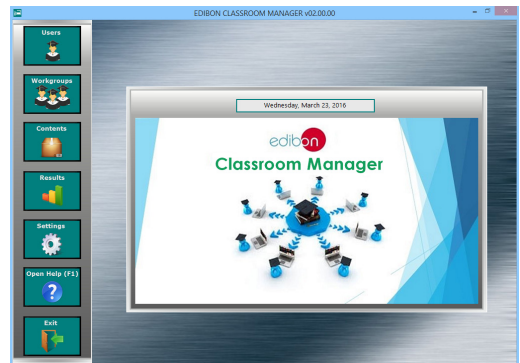
<u>Instructor Software</u>

### - 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.
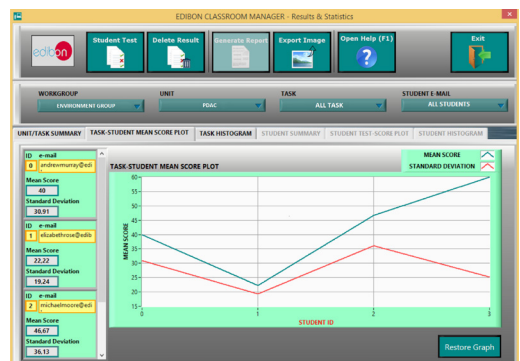- Report generation, User Progression Monitoring and Statistics.



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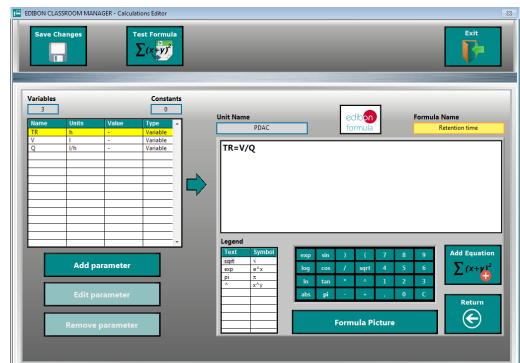


ECAL. EDIBON Calculations Program Package - Formula Editor Screen
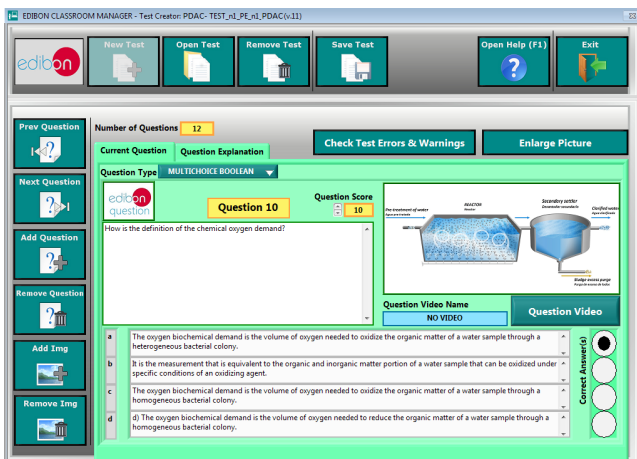


ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question



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

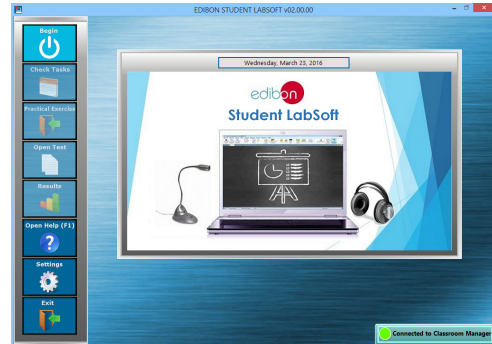## - ESL-SOF. EDIBON Student Labsoft (Student Software).

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.**

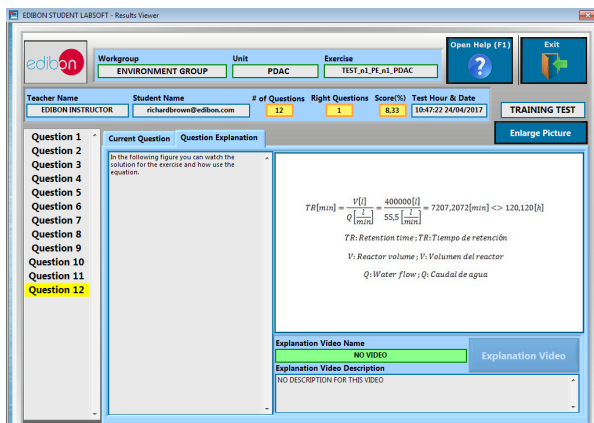For more information see **ICAI** catalogue. Click on the following link:

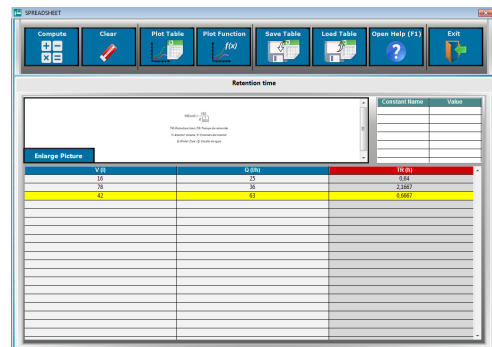www.edibon.com/en/files/expansion/ICAI/catalog



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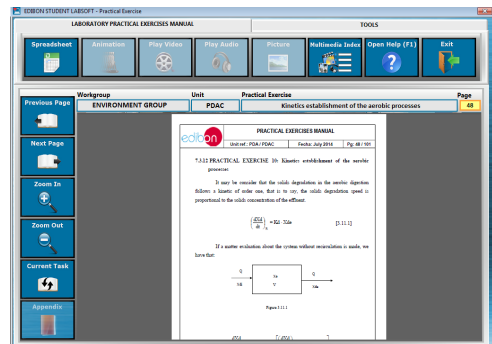


EPE. EDIBON Practical Exercise Program Package Main Screen



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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Edition: ED01/20
Date:    November/2020

REPRESENTATIVE: