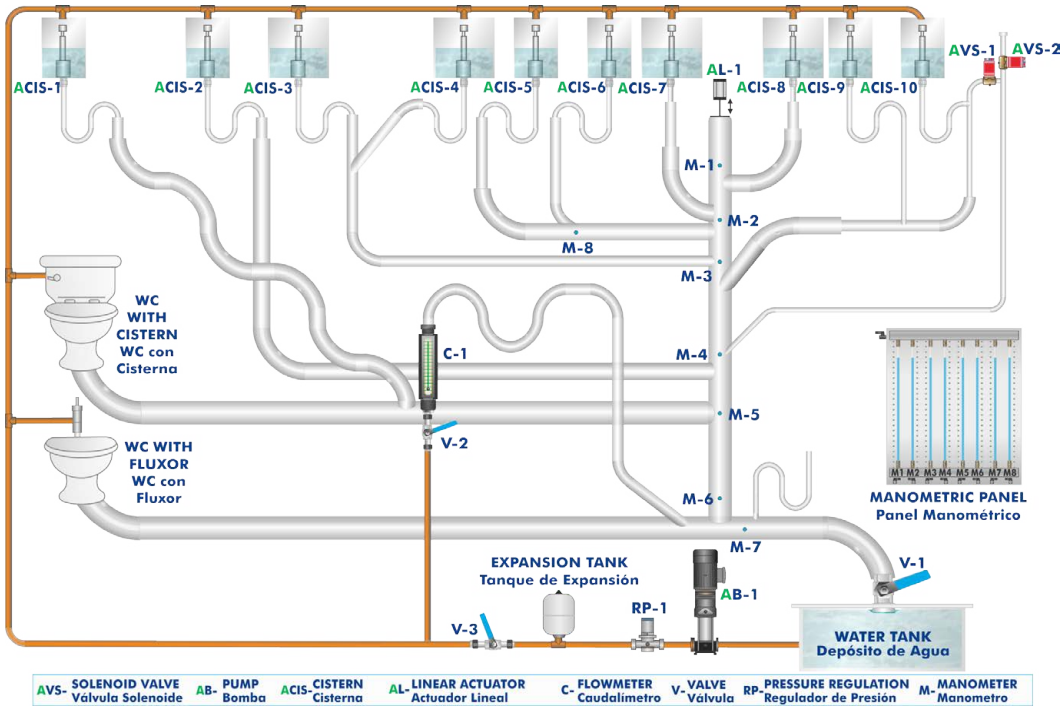
Sewerage Unit

TSID

Engineering and Technical Teaching Equipment

www.edibon.com
PRODUCTS
8.- FLUID MECHANICS AND 9.- THERMODYNAMICS & THERMOTECHNICS

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)

"Worlddidac Quality Charter" and Platinum Member of Worlddidac

INTRODUCTION

The supply of drinking water to a house requires three types of systems: cold water, hot water and sanitation, which includes the removal of waste water and rain water. Drinking water enters the house through the supply pipeline, which is the point where the house system is connected to the mains and wastewaters leave the house through the downpipe, being collected in the sewer pipe and diverted to the municipal sewer line.

Traditionally, waters are classified into three groups: white-waters, those waters with almost no dirt, they come from the rain or the soil moisture; grey-waters, coming from cleaning processes, they contain soaps and their organic matter content is low; and black-waters, they are foul waters with high content of organic matter and come from urinals, toilets or waste disposers.

Sanitation systems work thanks to gravity, pipes are vertical or have reduced slope to facilitate the flow of wastewaters towards the municipal network or septic tank in some cases.

When water is collected below the sewage system a pump, located in a storage well, is required to make the waters rise to the drainage level.

GENERAL DESCRIPTION

With the Sewerage Unit, "TSID", tests about a wastewater sanitation system can be made and the flow in a sewage system can be observed.

A complete sewage system can be observed with the "TSID" unit. The collection of wastewater from a series of sanitary ware and appliances is simulated, since all water supplies must include a downpipe. The unit has ten toilet tanks at the top, a toilet with tank, a toilet with pressure flush, ventilation pipes and bypass pipes. All of them are controlled by the user with solenoid valves. The tank valves are activated by remote control.

The unit is intended for studying pressure and flow in different junctions, cross sections and traps, under different aeration and ventilation conditions.

The water circuit of the unit is closed and consists of a collection tank and a pump to recycle water.

Eight manometers are included to study pressure; they indicate the pressure development in the downpipe. Pressure is an essential part to study for the design of sanitation systems, since design errors lead to noise, blockages, etc. Besides, all the pipes are transparent to allow the flow process visualization.

SPECIFICATIONS

Steel frame and painted steel panels.

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.

Ten transparent toilet tanks with solenoid valves controlled by the user via remote control:

- Six tanks of 10 l.
- Four tanks of 20 l.

Two toilets controlled by the user.

- Toilet with tank.
- Toilet with pressure flush.

All pipes are transparent to allow visualization of the flow interior.

Linear actuator for aeration of the downspout.

Two solenoid valves for pipe aeration.

Measuring instruments:

- Eight tube manometers: 850 mm WC to measure pressure along the downpipe.
- Flow meter with range: 0.5 – 6.3 m^3/h.

Pump:

- Power: 0.55 kW.
- Flow: 4.4 m^3/h.
- Manometric height: up to 45 m.

Collection tank:

- Approximate volume: 300 l.

Control panel:

- Main switch.
- Emergency stop.
- Pump switch.
- Pump speed regulator.
- Linear actuator switch for downspout aeration.
- Solenoid valve switches for aeration.

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.

TSID detail

EXERCISES AND PRACTICAL POSSIBILITIES

1.- Study of the flow in branch pipes and problems of erroneous designs.
2.- Study of the behaviour of siphons and the suction effect in pipes.
3.- Study of the aeration in pipes due to a correct dimensioning.
4.- Study the development of pressure in the downpipe.
5.- Study of the choice of joints and diameter changes in the drainage networks.
6.- Study the ventilation in the drainage systems.
7.- Study of the sizing of the main drain.
8.- Study of the flow measurement with rotameter.

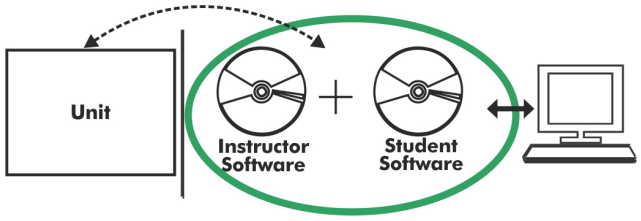
REQUIRED SERVICES

- Electrical supply: single-phase 200 VAC – 240 VAC/50 Hz or 110 VAC – 127 VAC/60 Hz.

DIMENSIONS AND WEIGHTS

TSID:
- Dimensions: 6000 x 800 x 4000 mm approx.
  (236.22 x 31.49 x 157.48 inches approx.)
- Weight: 1200 kg approx.
  (2645 pounds approx.)

TSID/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.

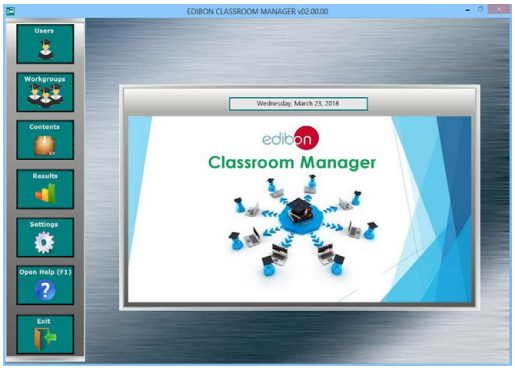
Instructor Software

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).

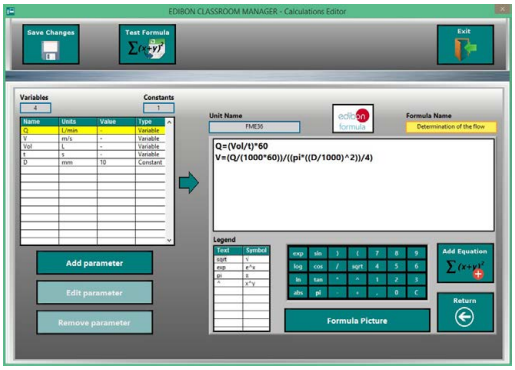
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual students, workgroups, units, etc... so the teacher can know in real time the level of understanding of any student in the classroom.

Innovative features:

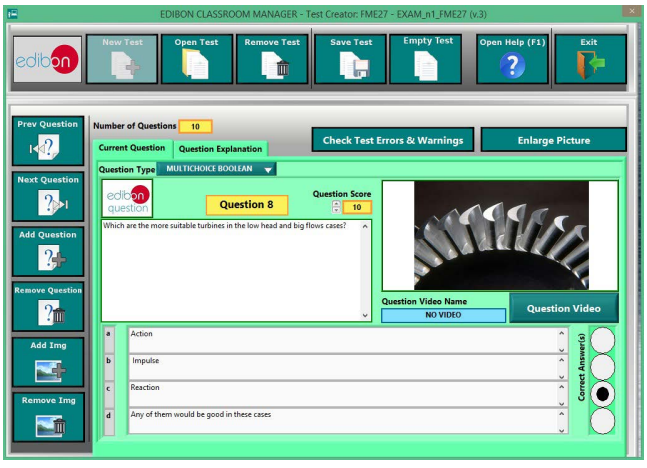
- **User Data Base Management.**
- **Administration and assignment of Workgroup, Task and Training sessions.**
- **Creation and Integration of Practical Exercises and Multimedia Resources.**
- **Custom Design of Evaluation Methods.**
- **Creation and assignment of Formulas & Equations.**
- **Equation System Solver Engine.**
- **Updatable Contents.**
- **Report generation, User Progression Monitoring and Statistics.**



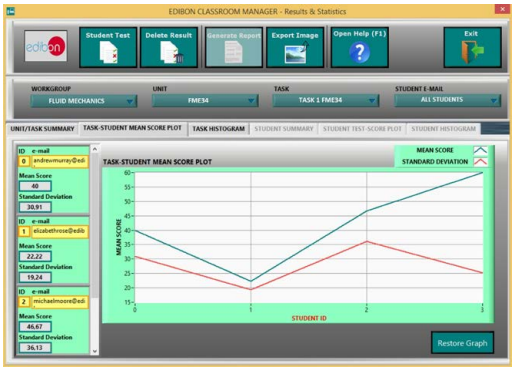
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



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

Optional

Student Software

- 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.

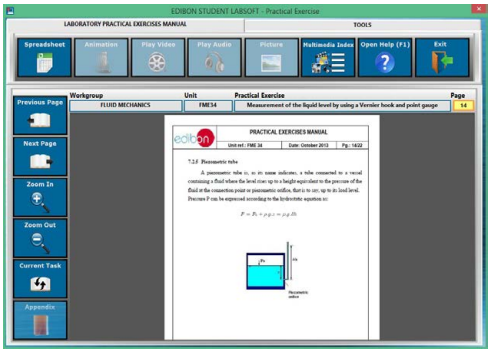
Innovative features:

- **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.**

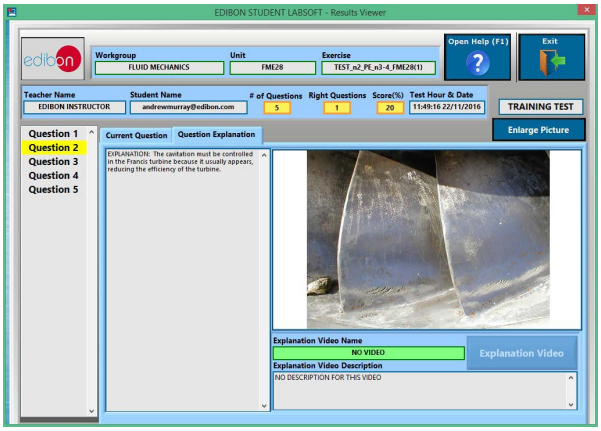
For more information see **ICAI** catalogue. Click on the following link:

www.edibon.com/en/interactive-computer-aided-instruction-software

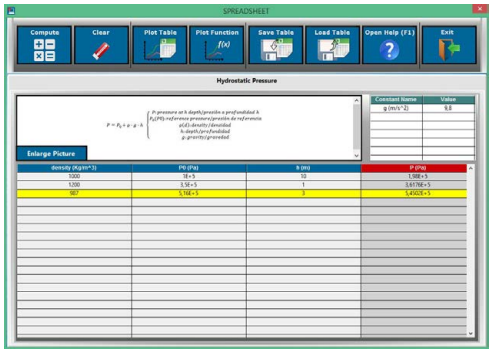
ESL-SOF. EDIBON Student LabSoft (Student Software) Application Main Screen



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: ED01/22
Date: July/2022

REPRESENTATIVE: