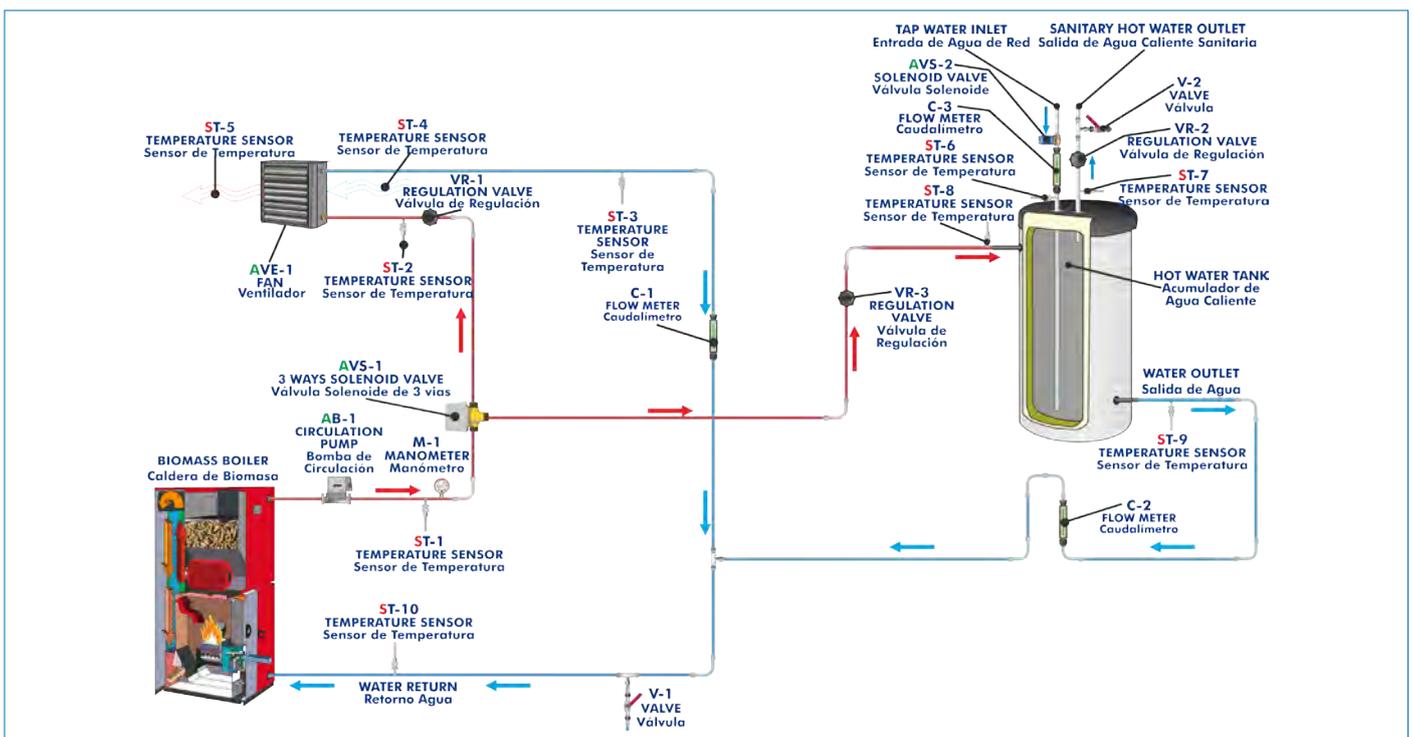




Electronic console

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

Energy is a limited natural resource whose generation in form of heat has economic costs and environmental impact of certain significance.

Biomass is that organic matter from vegetal or animal origin, including organic waste and residues, susceptible of being well exploited.

Plants transform the sun's radiant energy into chemical energy through photosynthesis, and part of this energy is stored as organic matter.

The knowledge and study of the characteristics and operation of the biomass systems, in such a way that facilitates the users to know these aspects in depth, allows to improve a responsible use and contributes to the wellbeing of everyone.

The Biomass Process Unit, "EBMB", designed by EDIBON, is a unit that allows the user to study heating systems and how to obtain domestic hot water with a biomass boiler.

GENERAL DESCRIPTION

The main element of the unit is the biomass boiler, which will heat the water that will flow through the other components transferring its heat.

The boiler is a biomass boiler of 16 kW that works with pellet and other granulated fuels. The body of the boiler is made of steel with a thickness of 5 mm that guarantees a long operating life. It includes a burner made of high temperature stainless steel with self-cleaning system, which allows the use of several granulated fuels apart from Pellet.

The boiler has ashes extraction boxes; besides it facilitates the access to cleaning and maintenance areas.

The boiler heats water that is impelled by a electronic console circulating pump through the circuit.

The unit also includes a three-ways solenoid valve that distributes the water heated by the biomass boiler towards two primary circuits: one towards the double jacket of the storage tank to obtain domestic hot water and the other towards the unit heater to generate heating.

This valve, when activated, allows the passage of water towards both directions. On the other hand, when deactivated, it closes the water passage towards the unit heater and increases the water flow towards the hot water storage tank.

The capacity of the storage tank is 60 l and it is made of AISI 316 Ti stainless steel. This material has an excellent behavior against corrosion and high temperatures. It has a double jacket through which the water previously heated in the boiler flows, constituting the primary circuit. There is a solenoid valve, located in the tap water inlet line towards the storage tank to be heated, that will be opened or closed according to the requirements.

The part of the unit where the heating generation is studied consists of an air heater controlled from the electric console, which is inside a methacrylate room, allowing the student to control the time it takes to heat the box to the desired temperature.

The primary circuit is closed with the recycling of both the water from the circuit that has already given its heat in the storage tank and the water leaving the unit heater. Both lines are joined and enter the boiler again, thus closing the primary circuit.

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.

Biomass boiler of 16 kW. It works with pellets and other granulated fuels:

- Hot water circulating pump.

- AISI 310 stainless steel burner.

- Expansion tank of 8 l.

- Safety valve (2.5 bar).

- Water content in the boiler: 45 l.

- Safety thermostat.

- Drain valve.

- Biomass boiler with a capacity of 97 Kg.

- Regulation of the temperature in the boiler: from 60°C to 87°C.

- Automatic cleaning system for the burner and ashes.

- It includes boxes for separation and removal of ashes (burner, furnace and fumes passing chamber).

- Fumes temperature to minimum thermal power: 90°C.

- Connection to the smokestack: 80 mm of diameter.

Double jacket storage tank made of stainless steel of 50 l for the DHW.

Unit heater:

- Power: 14900 Kcal/h.

- Air flow (at maximum speed of the fan): 1550 m³/h.

Box made of PMMA where the unit heater is located.

Three-ways electronic valve.

Solenoid valve located at the storage tank tap water inlet line.

Three regulation valves of the hot water through the different circuits.

Manometer, range: 0 - 4 bar.

Ten "J" type temperature sensors.

Three flow meter.

Electronic console:

- Metallic box.

- Temperature sensors connectors.

- Digital display for the temperature sensors.

- Selector for temperature sensors.

- Switches for the solenoid valves.

- Switch for the pump.

- Pump regulator.

- Fan switch.

- Fan regulator.

- 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.

EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Familiarization with the operation of a heating and DHW system with biomass boilers.
- 2.- Start-up of a biomass boiler.
- 3.- Determining the inlet and outlet temperature of the heating water.
- 4.- Determining the temperature of the domestic hot water.
- 5.- Measurement of the heat transfer of different biomass fuels to the heating water.
- 6.- Energy balance in the heating circuit (unit heater) with different types of biomass fuels.
- 7.- Energy balance in the sanitary water circuit with different types of biomass fuels.
- 8.- Influence of the heating water flow variation in the heat transfer.

REQUIRED SERVICES

- Electrical supply: single-phase 200 VAC – 240 VAC/50 Hz or 110 VAC – 127 VAC/60 Hz.
- Water supply and drain.
- Exhaust gases external exit.

DIMENSIONS AND WEIGHTS

- EBMB:
- Unit:
- Dimensions: 2500 x 750 x 1500 mm approx.
(98.42 x 29.52 x 59.05 inches approx.)
 - Weight: 250 Kg approx.
(551 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.)

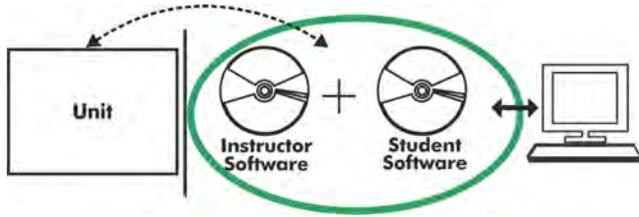
REQUIRED CONSUMABLES (Not included)

- Wood pellets - EN plus A1.

SIMILAR UNITS AVAILABLE

- EBMB. Biomass Process Unit. Offered in this catalogue:
- EBMC. Computer Controlled Biomass Process Unit. Offered in other catalogue:

EBMB/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.

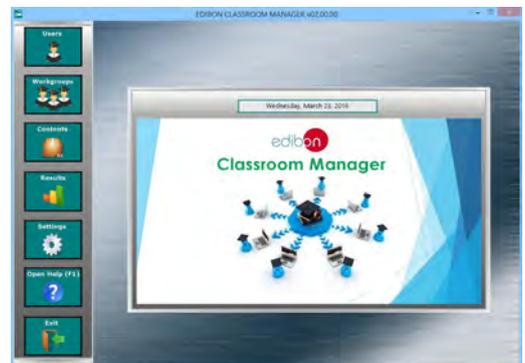
Instructor Software

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

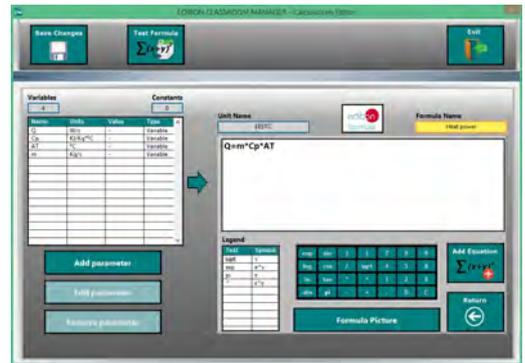
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual 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:

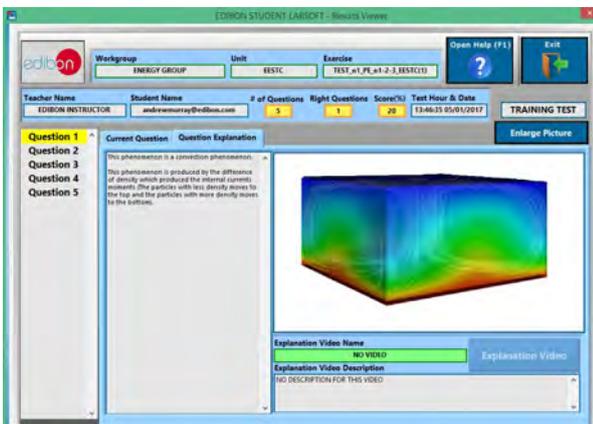
www.edibon.com/en/files/expansion/ICAI/catalog



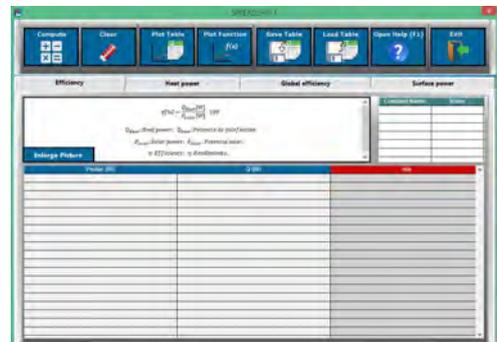
ESL-SOF. EDIBON Student LabSoft (Student Software)
Application Main Screen



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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