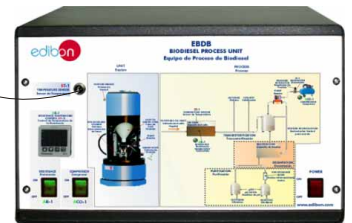


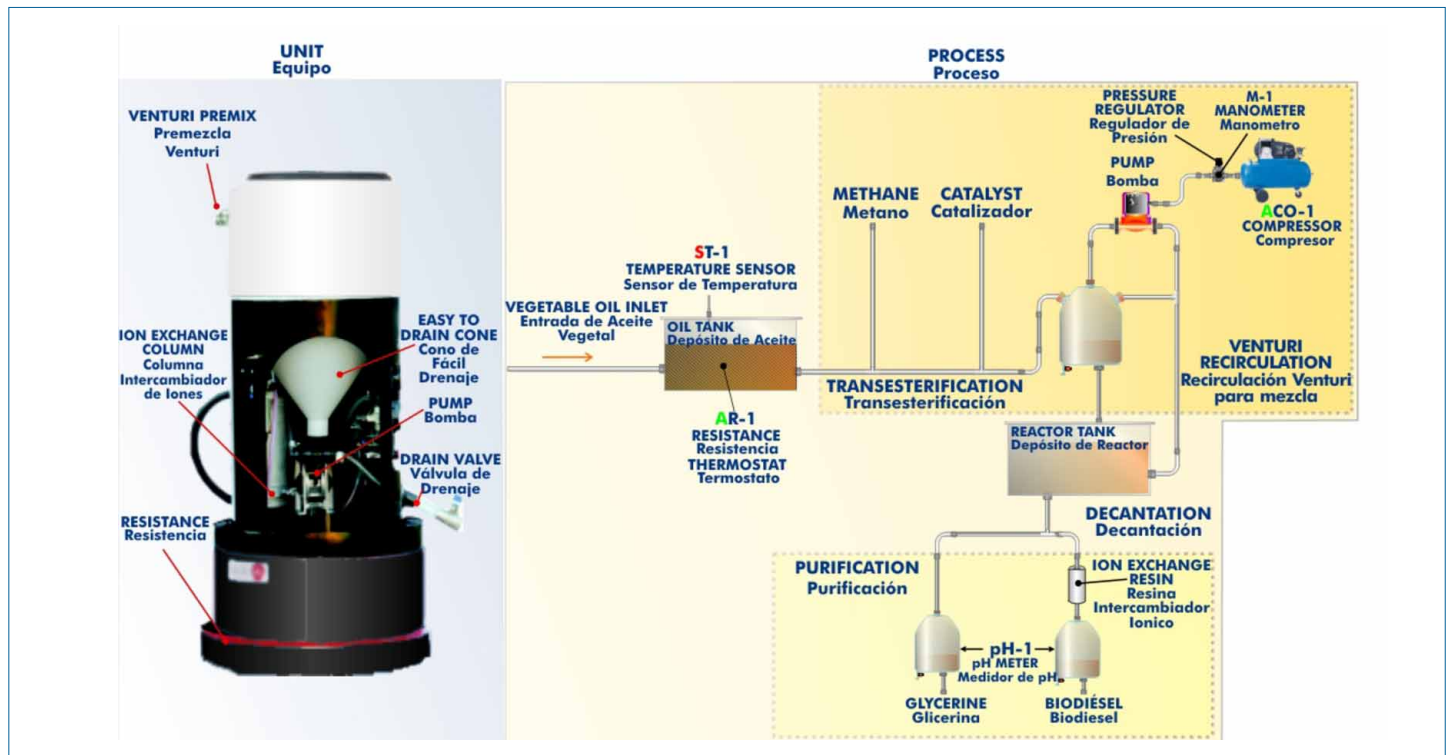
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Products range
Units
5.-Energy



Electronic console

PROCESS DIAGRAM AND UNIT ELEMENTS ALLOCATION



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)

GENERAL DESCRIPTION

The Biodiesel Process Unit (EBDB), developed by EDIBON, is an unit which allows the study of the biodiesel production cycle different stages. Different parameters that affect the whole process, as well as the obtained biodiesel quality, may also be studied.

The EBDB unit generates 50 litres of high quality biodiesel in 24 hours. The "ingredients" required for its generation are 50 litres of raw or used oil, 8 litres of methanol and a catalyst (liquid methylate is recommended). During the process, these substances are heated, mixed, separated and purified.

The chemical reaction to make biodiesel is quite simple. Vegetable oil is a "triglyceride", in other words, there are three hydrocarbon chains at the same glycerin molecule. A certain amount of catalyst is needed to break those hydrocarbon chains.

A chemical test, called titration, is needed to determine the amount of catalyst required to compensate the acidity excess in waste vegetable oils as a result of cooking. The accessories needed to carry out the test are supplied with the unit: pipettes, droppers, titrant, etc.

The catalyst is dissolved in methyl alcohol (methanol). This "premixure" is stirred strongly with the oil to enable a complete oil conversion. The mixture makes the catalyst break each hydrocarbon chain one by one, bonding it to a floating molecule of methanol afterwards to form biodiesel. Molecules without glycerin drop to the bottom of the reaction tank, where they are eliminated.

The unit uses an external heater with safety thermostat. It is controlled through the electronic console (PID control). It includes a pump which works with air (supplied by a compressor). This pump transfers the oil towards the reaction tank, homogenizes it, mixes the oil with the premix and mixes the oil batch in swirls. It also operates the Amberlite resin column and supplies the biodiesel to the vehicle or storage tank.

Glycerin obtained in the process is extracted through the drain valve located at the front of the unit. After removing the glycerin, a resin ion exchange integrated column facilitates the biodiesel purification process. Through a slow recirculation, this column removes soaps, glycerin and methanol excess, generating an excellent clean fuel. As long as the raw material is appropriate, the product will fulfil all the required standards for biodiesel.

Besides, the unit has two pumps, one for methanol and the other for the catalyst. They are manual pumps specially devised to be used with solvents, including alcohol.

The sensors and instrumentation provided with the unit allow:

- Know the vegetable oil preheating temperature and control it through a PID control.
- Control the air inlet pressure of the compressor which activates the circulation pump by means of a pressure regulator and a manometer. Agitation and recirculation levels will depend on this inlet pressure.
- Know the obtained amount (volume) of biodiesel, and by-products such as glycerin.
- Know the biodiesel pH in order to ascertain its quality.

SPECIFICATIONS

Anodized aluminium structure and panels in painted steel that guarantees a good stability and resistance.

Main metallic elements in stainless steel.

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

Wheels that facilitate the unit's mobility.

Reactor tank with inner tap (75 litres).

Oil heating tank (65 litres).

Heating band of 1.5 kW for the tank, controlled through the electronic console (PID control).

Premix bottle with couplings and hoses.

Membrane pump (maximum flow of 12 l./min.). The pump is operated by a compressor.

Compressor, range: 0-6 bar.

Pressure regulator with filter, range: 0.5 - 8.5 bar.

Manometer, range: 0-10 bar.

Stainless steel recirculation hose. Venturi recirculation system for the premixing process.

Paper filter of 10 microns (located before the biodiesel outlet tap).

Glycerin outlet tube and tap (glycerin drainage system).

Biodiesel hose and tap.

Purification compartment with two Kg of Amberlite (ion exchange resin column).

Plastic funnel with mesh for particles.

Regulator and air connectors.

Hoses and air connectors.

Polyethylene graduated biodiesel jerry can of 60 litres with dispenser tap. Polyethylene graduated glycerin can of 10 litres with dispenser tap.

Plastic pump for methanol. Plastic pump for catalyst.

Temperature sensor "J type". pH meter to determine the quality of the obtained biodiesel, range: 0-14 pH.

Titration kit:

Bottle of pH indicator. Suitable bottle for methanol. Bottle with titrant. 2 droppers of 5 ml. 3 glass flasks. Pipette of 5 ml. Pipette of 10 ml with manual pump. Plastic graduated vessel. Large plastic graduated vessel.

Biodiesel production:

Batch of 50 l. of biodiesel every 24 hours. Raw material needed for 50 l. of biodiesel: 50 l. of raw or used oil, 8 l. of methanol, and catalyst.

Electronic console:

Metallic box.

Temperature sensor connection. Digital display for the temperature sensor.

Heating band switch. Heating band controller.

Compressor 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 biodiesel production unit and identification and study of the different stages which comprises the biodiesel production process: heating, mixing, separation and purification.
- 2.- Study and performance of tests to determine the appropriate amount of catalyst to be used in the biodiesel production process (titration).
- 3.- Study of the agitation and mixing level influence on the final quality of the obtained biodiesel.
- 4.- Study of the washing and purifying stage influence on the final quality of the obtained biodiesel.
- 5.- Study of the influence of temperature at the vegetable oils preheating stage in the final quality of the obtained biodiesel.

Additional practical possibilities:

- 6.- Study of vegetable oils transesterification with an alcohol to produce biodiesel.
- 7.- Biodiesel quality test.

REQUIRED SERVICES

- Electrical supply: single phase, 220 V./50 Hz. or 110 V./60 Hz.
- For the production of 50 litres of high quality biodiesel (every 24 hours):
 - 50 litres of raw or used oil
 - 8 litres of methanol
 - Catalyst (liquid methylate or NaOH are recommended).

DIMENSIONS & WEIGHTS

EBDB:	
Unit:	-Dimensions: 1800 x 810 x 1550mm. approx. (70.86 x 31.89 x 61.02 inches approx.)
	-Weight: 160 Kg. approx. (352.74 pounds approx.)
Electronic console:	-Dimensions: 490 x 330 x 310mm. approx. (19.29 x 13 x 12.20 inches approx.)
	-Weight: 10 Kg. approx. (22 pounds approx.)

AVAILABLE VERSIONS

-EBDB. Biodiesel Process Unit.

Offered in this catalogue:

-EBDC. Computer Controlled Biodiesel Process Unit.

Offered in other catalogue:

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



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