



Model Series: BioD-800

Description:

The Biodiesel Process Trainer is a pilot-scale plant that demonstrates both batch and semi-continuous conversion of vegetable oil (triglyceride) feedstock into biodiesel (ethyl esters of fatty acids). The process trainer has instrumentation to provide for control of all process flows, temperatures and levels. This trainer provides students the opportunity to gain real operating experience focusing on all aspects of biodiesel production: the chemical process, control strategy, and management of the chemical process.

Function:

The conversion of triglycerides into biodiesel is normally performed by base-catalyzed conversion. This reaction takes place at modest conditions of temperature and pressure and

can produce conversion rates over 98%. The rate of reaction is influenced by several factors including temperature and degree of mixing. The Biodiesel Process Trainer is designed and built for instructional use and includes many student-friendly features. The main reaction vessel is constructed from industrial glass allowing the students to visually monitor the trans-esterification process.

This highly flexible process trainer incorporates various commercially available mixing technologies and process configuration options to allow for the comparative analysis of the technologies currently available in the biodiesel industry.

These mixing technologies include:

Batch processing with:	Semi-batch processing with:	Continuous processing with:
reactor circulation	static in-line mixing	static in-line mixing
static in-line mixing	high shear mixing	high shear mixing
high shear mixing	ultrasonic enhanced mixing	ultrasonic enhanced mixing
ultrasonic enhanced mixing		

This trainer integrates two biodiesel production process stages:

- Basic chemical conversion; and,
- Advanced product purification and methanol recovery systems.

The separation unit provides for distillation separation of the excess methanol and subsequent gravity separation of the produced biodiesel and glycerin by-product. The Biodiesel Process Trainer will produce (in an instructional laboratory setting) biodiesel approaching the commercial standard: ASTM-D-6751. With this process trainer the students will be responsible for the entire biodiesel production chain: from feedstock preparation to production of commercial grade B-100 biodiesel.

The Biodiesel Process Trainer is equipped with process measurement and control devices including programmable metering pumps. The entire trainer is controlled from an industry standard PLC interface and operator computer station.

Equipment Specification Highlights:

- 7 - 10 litres per hour oil processing capacity
- Materials of construction will be compatible with process fluids including: 304 SS, glass, brass/ copper, Teflon, LDPE, HDLPE, HDPE and PVC
- Glass reactor vessel - 6" (150 mm) Diameter
- Integral storage and mixing vessels are translucent for visual monitoring of the chemical processes
- Integral electric process heaters with PLC control
- Electronic process measurement and PLC control (PID control loops by PLC)
- Additional safety features include: combustible gas detector with power interlock and several
- Pneumatic powered process pumps & controls
- Complete skid-mounted unit with integral support structure
- Approximate overall dimensions - 762 x 3620 x 2460 mm high (30" x 143" x 97" high)
- Available in all world voltages / frequencies (customer to specify electrical power available on-site)