

# **HTDU – HEAT TRANSFER DEMONSTRATOR**

Controlling heat levels of fluids through industrial process operations is a very common requirement which has resulted in various heat exchanger configurations unique to specific applications. BTTC has designed the Heat Transfer Demonstrator with a view to showing differences in efficiency depending on exchanger design, material of construction, flow direction or pattern, and flow velocities. The HDTU is a self contained unit complete with flow and temperature indicators and controllers.

## **EQUIPMENT SPECIFICATIONS:**

- Entire unit mounted on metal structure with casters
- Two pumps for hot and cold fluid
- Manifoldd with valving to accommodate reverse flows
- Water heater with storage tank
- Refrigerant type water chiller with storage tank
- Flow meters and controllers on both phases
- Digital thermometers on inlet and discharge of flows
- Four various heat exchangers
- Brazed plate exchanger
- Single pass tube and shell – brass
- Single pass tube and shell – stainless steel
- Four pass tube and shell
- All non-moving parts will be powder coated for durability and corrosion prevention
- Approximate overall dimensions: 34” wide X 72” long X 72” high
- Unit operates on 240 volt single phase power

# **FDST – FLASH DRUM SEPARATOR TRAINER**

Many industrial processes deal with separation of volatile gasses dissolved in a liquid. Separation and recovery of the components is normally achieved using a flash drum. BTTC has designed our FDST to allow visual observance and physical control of the ‘flash drum’ process during the separation of water saturated with carbon dioxide. The dedicated control panel operates flow, pressure, and temperature measurement devices required to achieve the separation process within operating parameters.

## **EQUIPMENT SPECIFICATIONS:**

- Entire unit mounted on a metal structure with casters
- Pump for water phase
- Acrylic Flash Drum (separator tank)
- Electric heater (in flash drum)
- Pre-carbonator
- Carbon dioxide bottle
- Electronic analyzers
- Flow meters
- Pressure controllers
- Operates on 240 volt single phase power
- All static metal surfaces powder coated for durability and corrosion prevention

- Approximate overall dimensions: 34" wide X 48" X 60" high

## **Fluid Bed Catalytic Cracking Unit**

FCCU Glass Model Fluidized Bed Catalytic Cracking Unit

Dimensions:

Base enclosure:	30 1/2" x 21" x 14"
Reactor and Riser:	29" high
Reactor diameter:	3"
Regenerator:	21" high
Regenerator diameter:	4"

The model consists of a reactor, regenerator, standpipes, risers and air blower which forms the catalyst circulation system. The catalyst flow is controlled by the valves on the reactor and regenerator standpipes. Circulation fluidizing of the catalyst is achieved by injecting air into the air inlet of the regenerator, steam inlet of the stripper and the feed inlet to the reactor riser, and is controlled by three individual needle valves. Evaluations of start up, operation and shut down procedures in FCCU units can be invaluable to industry and educators. Demonstrations of catastrophic events may be safely simulated.

## **DTU-1 Working Glass Distillation Training Unit**

This actual working glass distillation unit is our full size model. The DTU-1 is state of the art in teaching process distillation, incorporating a stripper column as well as the main column and includes a custom chilled water unit.

The pressure system, temperature readouts and controls, pump switch panel and flow controls are centrally located for ease of operation and safety.

## **Distillation Training Unit**

DTU-2 Portable Glass Distillation Training Unit

The Process Operator Training Unit (DTU-2) was conceived and designed to give the operator of fractionation and distillation equipment a visual concept of what goes on inside those metal towers or columns that dominate the landscape in a petroleum refinery or petrochemical plant.

There are no automatic controls so that whatever happens on this unit is dependent on what the operator does, or does not do. The glass fractionating column allows the operator to see the results of his actions very quickly. Consists of the following equipment; Main Column, Pumps (4), Overhead Condensers, Heat Exchangers, Cooling System, Reboiler, Temperature Gauges and piping to actually perform distillation on a small scale model. This unit comes with carrying case which acts as a stand for the unit.

This unit has been a staple in the process training industry worldwide for many years and is currently our most widely used production item. With it's hands on learning experience it is hugely popular in basic process classes in industry and education.

Read the following from Jerry Duncun and Mike Cobb with College of the Mainland in Texas City, TX:

*The College of the Mainland uses the Glass Distillation Unit (DTU-2) in a variety of courses. The DTU-2 is used to teach students everything from how to draw P&IDs to the actual operation of a distillation column. The unit is extremely flexible and forgiving. You can demonstrate different flooding scenarios and have it recover in just a few minutes. The students comprehension of distillation principals is greatly improved by seeing the color graduation of the components across the column. The DTU is so heavily utilized by our instructors, that it generally undergoes a mini overhaul once a year just to keep it in top shape. We consider this equipment to be invaluable to our students and instructors in the Process Technology area.*

*Jerry Duncan, Assistant professor  
Co Chair Process Technology  
College of the Mainland  
Texas City, Texas*

*Mike Cobb, Assistant professor  
Co Chair Process Technology  
College of the Mainland  
Texas City, Texas*

## **Chiller Unit**

This unit has been developed to be used in conjunction with the Distillation Training Unit or DTU-2

As a replacement for the current cooling system for the glass tabletop distillation process this unit adds stability in process control and doubles as a training unit itself, with an acrylic case allowing component identification and a visual demonstration of the chiller process.

## **Other Process Training Units**

- EPTU Ethanol Process Training Unit
- CIT Chemical Injection Trainer
- F&L Flow and Level Unit