E20-UOP02
Continuous Distillation Study Unit

**Product Dimensions**
(L x W x D)
60in x 28in x 94.5in (150cm x 70cm x 240cm)
330 lbs. (150 kg) empty

**Shipping Dimensions**
(L x W x D)
65in x 33in x 100in (165cm x 178cm x 254cm)
380 lbs. (175 kg)

**FEATURES AND SPECIFICATIONS**
- Tubular stainless steel structural frame with four leveling feet.
- 5 Gal (20 L) polyethylene feed tank.
- Positive Displacement, variable speed feed pump with flow rate of 0 to 16 L/h and controlled via 4-20 mA input.
  - Electric pre-heater, 1 kW, with Pt 100 W temperature sensor, SS float-type water level control switch, relief valve and sampling valve.
- Column supply (or) manifold with three feed valves at three column elevations.
  - 8" (200 mm) Diameter, 6L (1.5 gal) glass shell reboiler with a 2 kW, stainless steel immersion-type, explosion-proof electric heater, SS float-type level control device, Pt 100 ? temperature sensor, 25 mm (1") loading hatch, overflow tube, three drain valves, one facilitating operation in batch mode.

**GENERAL DESCRIPTION**
This working, controlled or manually-operated, continuous distillation study unit and training aid, provides for an in-depth, hands-on understanding of both the practical and theoretical properties of the distillation process. The device allows the student to experience and operate a continuous or a batch distillation process and modify the variables upon which it is based. The product depicts the dynamic behaviour of a distillation column with packing, or alternately with optional bubble-cap trays, as it is being operated by the instructor and/or a student.

Ethanol, in reduction with water, is used as the primary feedstock, based on its well-known physical properties and safety considerations. The unit can be operated using an on-board touch screen system which can also allow operation by a connected computer located inside or outside the same area.

Pre-heat temperature, feed flow rate, reboiler temperature, and reflux rate can be measured and controlled using an on-board touch screen system or mimic workstation.

A variety of safeguards are provided including; a low level reboiler liquid level switch, explosion-proof reboiler heater assembly with self-limiting heater elements, pre-heater low level switch, pre-heater safety valve, condenser thermostatic switch with relay, emergency stop-switch, with key, and provision for lock-out/tag-out.

The training aid includes a glass, 50 mm (2") diameter distillation column with multi mesh (multi-knit) packing, complete glass reboiler, glass condenser, and stainless steel distillate heat exchanger, allowing visualization and study of the primary components of the distillation process under continuous operation.

A stainless steel frame, and stainless completed with glass primary process components, ensures a long and trouble-free service life.

**OPTIONS**
- #600-011 - Chiller System
- #905L - Supplemental Workbench, Lab-Top
- #600-011D - Chiller System, Compact
- #UOP02-002 - Trans-System Differential Pressure Measurement and Control System
- #UOP02-003 - Bubble cap tray (15 trays) column
- #UOP02-004 - Supplemental Stainless Steel Drip Tray
- #UOP2-910 - One day, on-site, “train the trainer” program including commissioning and one-on-one training.

**RELATED ITEMS**
- #290 - Distillation Column Model
- #290-010 - Random Packing Sample Set

**STANDARD ACCESSORIES**
Primary column with three 50 mm (2") dia. glass sections with removable heating/insulation blankets, multi mesh (multi-knit) packing, and including three stainless steel connecting structural plates incorporating sample connections with stainless steel sample valves, and PT 100 ° temperature sensors.

50mm (2") Dia. Glass reflux head with glass, solenoid-actuated diverter valve, and additional PT 100 ° temperature sensor.

50mm (2") Dia. glass condenser, with stainless steel cooling coil, including thermostatic system safety switch and vent.

Trans-column differential pressure transmitter (reboiler to condenser) (facilitates column control).

Stainless steel distillate cooling heat exchanger with sampling/drain valve.

1L Graduated glass receiver with dump valve and 10L (10.5qt) polyethylene collection tank.

1L Grated glass bottom product receiver and 10L (10.5qt) polyethylene collection tank.

Condensing cooling water/circuit, including inlet and outlet temperature sensors, pressure reducing valve, solenoid control valve, and turbine flow meter. (Cooling via city (mains) water to drain or via optional chiller.)

COURSE CONTENT

Primary operation and experiment outline:

- Review of the distillation process P&ID;
- Exploration of system and components
- System preparation
- Operation of the distillation column with water
- Optimizing column reflux and distillation using water
- Distillation process operation with ethanol and water as a feedstock
- Fine-tuning of the process to achieve specific results
- Introduction to system troubleshooting
- Detailed review of distillation column feed, reflux operation and residue cycling activities

Distillation of alcohol-based products has inherent risks. DAC assumes no liability for the use or misuse of this educational product.

In accordance with DAC’s established policy of continuous improvement, these specifications and product descriptions are subject to change without notice. This information is the latest technical information as of the time of viewing or printing.