BATCH DISTILLATION
PILOT PLANT

Mod. UDB/EV manual
Mod. UDBc/EV manual with data logging
Mod. UDBa/EV automated

INTRODUCTION

The distillation column is made completely of glass and it consists of a reboiler, of a bubble cap tray column and of a condenser with reflux head and valve.
The distillate is collected into a glass tank after being cooled by a heat exchanger.
The automated version mod. UDBa/EV is equipped with PID controller: using two pneumatic valves, this controller can automatically control the flow rate of condenser cooling water and the vacuum degree of the plant.

TRAINING PROGRAM

This unit enables to deepen the following issues:

- Distillation of different mixtures (water / ethanol, water / methanol, methanol / propanol, etc...) at atmospheric pressure, versus the variation of the following operational parameters:
  - reflux ratio
  - reboiler heating power
  - bottom composition
  - vacuum degree
- Mass balance
- Energy balance
- Flooding
- Calculation of the number of theoretical trays
- Automatic flow and pressure control by PID controller (for mod. UDBa/EV, only)
- Plant supervision by P.C. (for mod. UDBa/EV, only)

TECHNICAL SPECIFICATIONS:

Mod. UDB/EV

- Framework of AISI 304 stainless steel with castors
- Distillation column of borosilicate glass with 7 bubble cap trays, DN50, h = 600 mm
- Reboiler of borosilicate glass, with capacity of 5 l, including electric heater of 1600 W
- Condenser of borosilicate glass with reflux head
- Tank of borosilicate glass for the collection of distillate with capacity of 1 l
- Tube-in-tube heat exchangers of AISI 304 stainless steel
- 6 thermoresistances Pt100 with sheath of AISI 316 stainless steel
- 6 board-type electronic temperature indicators
- Thyristor unit for controlling the power of reboiler electric heater
- 2 programmable timers for the control of reflux ratio
- Variable area flowmeter of glass and steel, with range of 25 to 250 l/h (for mod. UDB/EV, only)
- Vacuum gauge of AISI 304 stainless steel with range of 0 to -1 bar
- Vacuum circuit with trap of AISI 304 stainless steel
- Piping and valves of AISI 304 and 316 stainless steel
- Switchboard IP55, complying with EC conformity mark, including plant synoptic and ELCB
- Emergency button

ELETTRONICA VENETA S.P.A. - 31045 Motta di Livenza (TV) Italy - Via Postumia 16 - Tel. +39 0422 765 802 - Fax +39 0422 861 901 - E-mail: export@elettronicaveneta.com

Mod. UDBc/EV

Besides being provided with all the technical specifications of mod. UDBc/EV, this model also includes the following additional items:

- Variable area flowmeter of AISI 304 stainless steel, with range of 25 to 250 l/h and 4-20 mA output signal
- Residual pressure electronic transmitter of stainless steel, range of 0 to 1000 mbar and 4-20 mA output signal
- Interface for the connection with the PC included in the switchboard
- Data acquisition software for Windows

Mod. UDBa/EV

Besides being provided with all the technical specifications of mod. UBC/EV, this model also includes the following additional items:

- Oil vacuum pump with flow rate of 4 m^3/h, provided with trap of AISI 304 stainless steel
- Variable area flowmeter of AISI 304 stainless steel, with range of 25 to 250 l/h and 4-20 mA output signal
- Pneumatic valve of AISI 316 stainless steel for controlling the flow rate of the condenser cooling water, Cv = 0.32
- Residual pressure electronic transmitter of stainless steel, range of 0 to 1000 mbar and 4-20 mA output signal
- Pneumatic valve of AISI 316 stainless steel for controlling the residual pressure, Cv = 0.32
- 2 electropneumatic converters of 4 to 20 mA/ 0.2 to 1 bar
- Microprocessor digital PID controller with serial card
- Supervision software for Windows: it enables to control ON-OFF signals, analog signals coming from the PID controller, real-time trend and historical trend

Power supply: 230 Vac 50 Hz single-phase - 2,5 kVA
(Other voltage and frequency on request)
Dimensions: 1600 × 700 × 2200 mm
Weight: 130 kg

REQUIRED

UTILITIES (PROVIDED BY THE CUSTOMER)

- Tap water: 250 l/h @ 2 bar (valve with ½" hose connector)
- Compressed air (for mod. UDBa/EV, only): 1 Nm^3/h @ 6 bar (valve with connection of ¼" F)
- Water drain
- Fume suction system

ACCESSORIES (NOT INCLUDED)

- Analytical instruments for analyzing the composition of the distilled mixture (e.g.: a refractometer)
- Personal Computer running Windows (for mod. UDBc/EV and mod. UDBa/EV, only)

SUPPLIED WITH

THEORETICAL – EXPERIMENTAL HANDBOOK

OPTIONAL ITEMS

- Electronic differential pressure transmitter for measuring the pressure drops in the column
- Oil vacuum pump (for mod. UDB/EV and mod. UDBc/EV, only)
- Borosilicate glass distillation column with sieve trays, DN 50
- Borosilicate glass distillation column with Raschig rings packing, DN 50

VARIATIONS OF THE PLANT ON REQUEST

The equipment can be modified on request of the Customer.