

ABSORPTION AND STRIPPING PILOT PLANT

Mod. ADS/EV
Mod. ADSa/EV

manual
automated

INTRODUCTION

This absorption and stripping system enables to study the mass transfer from a gaseous phase to a liquid phase (absorption) and vice versa (stripping).

The absorbing liquid is fed by a metering pump to the top of a column with glass Raschig rings packing.

The gaseous phase is the result of the mixture between the gas to be absorbed and a carrier gas; the flow rates of these two gases are measured by mass flowmeters.

The automated version (mod. ADSa/EV) includes a PID controller that controls the flow rates of gases automatically via two pneumatic valves.

TRAINING PROGRAM

This unit enables to deepen the following issues:

- Checking the absorption degree with different liquid substances at different temperatures
- Desorption of liquid phase into gaseous phase with a gas
- Calculation of the number of theoretical stages
- Automatic flow control by PID controller (for mod. ADSa/EV, only)
- System supervision by P.C. (for mod. ADSa/EV, only)
- Absorption of NH_3 with H_2O
- Absorption of CO_2 with solution of NaOH
- Stripping of NH_3 with air



TECHNICAL SPECIFICATIONS:

Mod. ADS/EV

- Framework of AISI 304 stainless steel with castors
- Column of borosilicate glass DN 80, H = 1000 mm, packed with Raschig rings
- Heat exchanger of borosilicate glass, with exchange surface of 0.5 m², installed at the bottom of the column
- Feeding tank of AISI 304 stainless steel, with capacity of 30 l
- Metering pump of AISI 316 stainless steel, Q_{max} = 270 l/h, including pneumatic actuator, that can be driven by a signal of 0.2 to 1 bar
- 2 pneumatic control valves of AISI 316 stainless steel, DN 15, Cv = 0.2 and 0.08
- Electronic thermal mass flowmeter of AISI 316 stainless steel, with range of 0 to 600 NI/h and board-type display, for measuring the flow rate of the gas to be absorbed
- Electronic thermal mass flowmeter of AISI 316 stainless steel, with range of 0 to 6000 NI/h and board-type display, for measuring the flow rate of the carrier gas
- Electronic differential pressure transmitter of AISI 316 stainless steel, range of 0 to 200 mm H₂O, 4-20 mA output signal, board-type display
- 3 thermoresistances Pt 100 with sheath of AISI 316 stainless steel
- 3 electronic temperature indicators
- 3 pneumatic manual controls (for mod. ADS/EV, only)
- Piping and valves of AISI 304 and AISI 316 stainless steel
- Switchboard IP55, complying with EC conformity mark, including plant synoptic and ELCB
- Emergency button

Dimensions: 1900 × 800 × 3000 mm

Weight: 270 kg

Mod. ADSa/EV

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

- 3 electropneumatic converters (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 PID controller, real-time trend and historical trend

REQUIRED

UTILITIES (PROVIDED BY THE CUSTOMER)

- Power supply: 400 Vac 50 Hz three-phase - 1,5 kVA (Other voltage and frequency on request)
- Tap water (valve with ½" hose connector)
- Hot water: 150 l/h @ 2 bar and 90 °C (only for stripping operations)
- Water drain
- Compressed air: 15 Nm³/h @ 6 bar (valve with connection ¼" F)
- Cylinder for the transfer gas (e.g.: nitrogen) with pressure reducer
- Cylinder for the gas to be absorbed (e.g.: CO₂) with pressure reducer
- Fume suction system or venting duct

ACCESSORIES (NOT INCLUDED)

- Personal Computer running Windows (for mod. ADSa/EV, only)
- Laboratory glassware for titration

SUPPLIED WITH

THEORETICAL – EXPERIMENTAL HANDBOOK



VARIATIONS OF THE PLANT ON REQUEST

The equipment can be modified on request of the Customer.

OPTIONAL

HOT WATER GENERATOR

mod. SCT01/EV (only for stripping operations)