

BATCH REACTION PILOT PLANT

Mod. REC/EV
Mod. RECC/EV
Mod. RECa/EV

manual
manual with data logging
automated

RE

INTRODUCTION

This pilot plant concerns the batch reaction; the study of kinetics is carried out versus the variation of conductivity in the reactor.

This reactor includes an electric heater and a distillation column with condenser.

The automated version mod. RECa/EV is equipped with PID controller for the automatic control of reaction temperature.

TRAINING PROGRAM

This unit enables to deepen the following issues:

- Determination of reaction kinetics
- Reaction thermodynamics
- Mass and energy balance
- Sizing of an homogeneous reactor
- Automatic temperature control with PID controller (for mod. RECa/EV, only)
- Plant supervision by P.C. (for mod. RECa/EV, only)
- Exercises than can be carried out:
 - kinetics of hydrolysis of ethyl acetate
 - preparation of p-Toluensulfonic acid
 - preparation of diethyl adipate
 - preparation of cyclohexanonoxime from hydroxylamine sulfate and cyclohexanone
 - transformation of acetic anhydride into acetic acid and display of reaction kinetics by measurement of conductivity
 - preparation of amide

TECHNICAL SPECIFICATIONS:

Mod. REC/EV

- Framework of AISI 304 stainless steel with castors
- Reactor of borosilicate glass, with capacity of 3 l and electric heater of 1.0 kW
- Stirrer for reactor provided with mechanical seal lubricated with silicone oil, 0 to 400 rpm
- Electronic rpm indicator of the stirrer
- Distillation column of borosilicate glass, DN25, packed with mesh of AISI 316 stainless steel
- Over head condenser of AISI 316 stainless steel
- Tanks of borosilicate glass, with capacity of 1 l, for adding reagents



- 2 tanks of borosilicate glass, with capacity of 2 l, for collecting distillate
- 2 thermoresistances Pt 100, with sheath of AISI 316 stainless steel
- 2 electronic temperature indicators
- Electronic conductivity meter with automatic temperature compensation
- Circuit for the connection with vacuum pump (not included), equipped with check valve
- Vacuum gauge of AISI 304 stainless steel, with range of 0 to -1 bar
- 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

Mod. RECc/EV

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

- Interface for the connection with a PC included in the switchboard
- Data acquisition software for Windows

Mod. RECa/EV

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

- 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

Power supply: 230 Vac 50 Hz single-phase - 1,5 kVA
(Other voltage and frequency on request)

Dimensions: 1700 × 600 × 1850 mm

Weight: 150 kg

REQUIRED

UTILITIES (PROVIDED BY THE CUSTOMER)

- Tap water: 150 l/h @ 2 bar (valve with ½" hose connector)
- Water drain
- Fume suction system

ACCESSORIES (NOT INCLUDED)

- Personal Computer running Windows (for mod. RECc/EV and mod. RECa/EV, only)

SUPPLIED WITH

**THEORETICAL – EXPERIMENTAL
HANDBOOK**



VARIATIONS OF THE PLANT ON REQUEST

The equipment can be modified on request of the Customer.