REVERSE OSMOSIS PILOT PLANT

Mod. OI/EV manual
Mod. OIa/EV automated

INTRODUCTION

The phenomenon of osmosis is reversible, consequently, if a solution in contact with a semipermeable membrane undergoes a mechanical pressure higher than its osmotic pressure, some solvent will cross the membrane and this phenomenon is called reverse osmosis.

It can easily be realized that this phenomenon can be used for seawater desalination or to concentrate and purify waste waters.

TRAINING PROGRAM:

The process unit enables to develop and analyze the following issues:

- effect of operating pressure
- effect of feed flow rate
- effect of UV light treatment (sterilization of permeate)
- concentrate and permeate ratio
- optimizing reverse osmosis process
- automatic PID control (only for mod. OIa/EV)
- plant supervision (only for mod. OIa/EV)

TECHNICAL CHARACTERISTICS:

Mod. OI/EV

- Framework of AISI 304 stainless steel with castors
- Feed tank of AISI 316 stainless steel with capacity of 90 l
- Tank of AISI 316 stainless steel for collecting permeate, with capacity of 60 l
- Feed piston pump of AISI 316 stainless steel, including microfilter (5 µ) in suction, with flow rate of 0 to 700 l/h, P_{max} = 60 bars
- Magnetic drive gear pump for transferring permeate to UV lamp
- Safety pressure switch
- Osmosis membrane with housing of AISI 316 stainless steel
- Bourdon gauge of AISI 304 stainless steel with range of 0 to 60 bars
- Variable area flowmeter of stainless steel and glass with range of 20 to 200 l/h (only for mod. OI/EV)
- Variable area flowmeter of stainless steel and glass, with range of 80 to 800 l/h (only for mod. OI/EV)
- Variable area flowmeter of stainless steel and glass, with range of 100 to 1000 l/h (only for mod. OI/EV)
- UV lamp for sterilizing permeate
- Microprocessor conductivity meter with sensor of stainless steel and range of 0 to 2000 µs/cm
- Connecting lines and valves of AISI 304 and 316 stainless steel
- Switchboard IP55, complying with EC conformity mark, including plant synoptic and ELCB
- Emergency pushbutton

Dimensions: 1700 x 700 x 2080 mm
Weight: 250 kg

Mod. OIa/EV

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

- Electronic flow-rate transmitter with range of 0 to 200 l/h and 4 to 20 mA output signal
- Electronic flow-rate transmitter with range of 0 to 600 l/h and 4 to 20 mA output signal
- Electronic flow-rate transmitter with range of 0 to 1000 l/h and 4 to 20 mA output signal
- Electronic pressure transmitter of stainless steel, with range of 0 to 60 bars and 4 to 20 mA output signal
- Pneumatic valve of AISI 316 stainless steel for control of pressure, Cv = 0.32
- Pneumatic valve of AISI 316 stainless steel for controlling the discharge flow rate of concentrate, Cv = 0.2
- Digital microprocessor PID controller with two control loops
- 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 Vca 50 Hz three-phase - 4 kVA (Other voltage and frequency on request)
- Compressed air (female valve of ¼"): 1 Nm^3/h @ 6 bars (only for mod. OIa/EV)
- Tap water (valve with ½" hose connector)
- Water floor drain

ACCESSORIES (NOT INCLUDED)

- Personal Computer running Windows (only for mod. OIa/EV)

SUPPLIED WITH

THEORETICAL – PRACTICAL – EXPERIMENTAL HANDBOOK

VARIATIONS OF THE PLANT UPON REQUEST:

This equipment can be modified upon specific request of the Customer.

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