

EX Reverse Osmosis Plant



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Reverse Osmosis is a technique for the removal of the total dissolved solids in water. The separation process is derived from the naturally occurring phenomenon known as Osmosis.

The Reverse Osmosis process comprises of two waters separated by a semi-permeable membrane one of a high concentration of dissolved solids and one with a low concentration. The semi-permeable membrane will only allow pure water to pass through leaving the solids behind. If a pressure is applied to the water containing the high concentration of solids then the volume of water on the low concentration side of the membrane is increase hence pure water, known as 'permeate' is produced.

As this process proceeds the concentration of solids in the water on the high-pressure side is increased and if this were allowed to continue fouling would eventually occur. To prevent this a proportion of the water on the high concentration side is continually discharged to drain allowing fresh water to enter the system and dilute the solids level. The discharge water is known as the 'reject' water.

Specification Reverse Osmosis Units

Unit design

A polypropylene covered steel base frame with plastic front panel houses the instruments and controls.

Inlet filter with 5 micron cartridge and 2 pressure gauges, High pressure pumps, low-noise, multi-stage centrifugal type, Low energy wound modules with energy saving PA/PS

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composite membranes in GRP pressure vessels with liner, Valves and instruments including feed water sampling valve, solenoid air driven inlet valve, feed water pressure switch, permeate, concentrate and concentrate recirculation flow meters, vibration resistant pressure gauges for pump and concentrate pressure, valves for adjustment of permeate, concentrate and concentrate recirculation flow rate.

Microprocessor control system, as described below, Electrical switchgear for control of the high-pressure pump and isolator main switch.

Unit completely wired and pre-assembled and ready for installation. Electrical equipment is manufactured in accordance with VDE 0100 part 600, VDE 113 part 1.

OS3020 microprocessor control system for fully automated monitoring and control of the reverse osmosis unit with graphics display with scrollable display (selectable) of operating data: permeate, operating hours and time.

Malfunction signals: low pressure, high conductivity pre-alarm (permeate), high conductivity fault (permeate).

Status signals: operation, permeate rinse, concentrate displacement concentrate rinse, intermittent rinse during shut down, shut down by external signal (forced stop, regeneration), tank full.

Inputs (low voltage) for level control with 1 or 2 float switches and 2 universal inputs.

Outputs for 2 solenoid valves for concentrate rinse, permeate discard and recycling, collective malfunction, pre-alarm high conductivity and freely programmable universal output each on floating changeover contact, analogue output of permeate conductivity and permeate temperature.

- Operator's function with password on different levels with selectable values and times
- Interval for intermittent rinse when tank full 0-999 min
- Duration of rinse when tank full 0-999 min
- Duration of concentrate rinse 0-999 min
- Duration of permeate discard according to conductivity min.0-999sec, max.0-999min.
- Pre-selectable conductivity range for permeate 0.5-50 mS/cm, 2-200 µS/cm.
- Individual test of all inputs or outputs with LCD (diagnostics).
- Languages of LCD: English/German/ French/Italian/Spanish/Dutch.

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| Technical Data | | 300 | 600 | 900 | 1200 |
|------------------------------------|------|------------|--------|--------|--------|
| Permeate Flow | l/h | 300 | 600 | 900 | 1200 |
| Min. salt rejection | % | 97 | | | |
| Max. recovery | % | 75 | | | |
| Operating Pressure | bar | 10 | | | |
| Membrane Element / number | | 4040/1 | 4040/2 | 4040/3 | 4040/4 |
| Voltage | V/Hz | 240v, 50Hz | | | |
| Motor Power | kw | 0.75 | 0.75 | 0.75 | 0.75 |
| Inlet connection | | 1" | 1" | 1" | 1" |
| Permeate/Concentrate connection DN | | 1" | 1" | 1" | 1" |
| Min/max feed water pressure | bar | 2/6 | | | |
| Min/max feed water temperature | °C | 5/35 | | | |
| Max. ambient temperature | °C | 40 | | | |
| PH | | 3 - 11 | | | |
| Height | mm | 1350 | 1350 | 1350 | 1350 |
| Width | mm | 1000 | 1300 | 1300 | 1300 |
| Depth | mm | 770 | 770 | 770 | 770 |
| Weight | kg | 275 | 300 | 350 | 400 |

The units are designed for a maximum TDS of 1000 mg/l, a water temperature of 15°C and a maximum colloidal index of 3. No restriction should be fitted to the permeate line. Under these conditions the units will still reach their designs permeate flow after three years operation. The recovery percentage depends on the raw water quality and the type of pre-treatment used.