

Reverse osmosis process description

Reverse osmosis (RO) is the water treatment technology applied for water demineralization and desalination. Due to high pressure of raw water input, water molecules pass through semipermeable membrane from more concentrated solution to less concentrated. Dissolved salts, heavy metals, organic compounds and microorganisms are not capable to penetrate through a membrane and are drained as concentrate. Reverse osmosis technology allows to remove up to 99.2 % of all dissolved salts, depending on water quality, temperature, applied pressure, type of membranes and the scheme of plant.

Advantages:

- Reverse osmosis combined with clean water reservoir and water supply system;
- Chemically and bacteriologically clean and safe water according to international drinking water quality standards;
- Plug&play, easy installation, operation and maintenance;
- Competitive price;
- Compact system with high quality components;
- Stable performance.

Application:

- Households with need for high water quality standards for sanitary and drinking;
- Commercial-bakeries, craft breweries, medical care, SPA&Healthcare, hotels, guest houses;
- Industrial - irrigation, farms, humidification, steam generation, etc.

Reverse osmosis design:

- Noncorrosive stainless-steel frame AISI304;
- Sediment filter with polypropylene cartridge 5 microns for safety and membrane protection;
- Operation controller MANITRONICA;
- Acryl permeate and concentrate flow meters;
- Glycerin-filled pressure gauges 4 pieces;
- MWG high pressure pump and Grundfos SBA3-35A booster pump with integrated control unit;
- Polyethylene food grade clean water reservoir volume 500 liters;
- Piping system glued PVC-U fittings PN16, John Guest quick connection fittings, high pressure hydraulic flexible tubes;
- Reverse osmosis membranes CSM RE4021-BLN (2 pieces);
- Control panel illumination;
- Antivibration gaskets for high pressure pump and frame.

Quality and performance control:

- Permeate water online conductivity meter (range: 0-499 $\mu\text{S}/\text{cm}$);
- Low pressure switch for raw water to prevent dry running of the high-pressure pump;
- Water pressure control - after sediment filter, after high pressure pump, concentrate;
- Permeate flow control;
- Concentrate flow meter and regulation;
- Recirculation flow control and regulation;
- Pump pressure regulation valve;
- High conductivity alarm (adjustable);
- Automatic/manual flushing system;
- Recirculation regulation valve;
- Full reservoir switch (float system);
- High pressure switch for permeate.

Technical parameters	Unit	WRO200 PLUS
Permeate production flow rate*	liters/hour	200-250
	liters/day	4000-6000
Clean water supply flow rate	liters/hour	3000
Clean water supply pressure	bar	3.5
Permeate production operating pressure max.	bar	15
Recovery	%	65-75
System dimensions (length x width x height)	cm	84 x 70 x 166
Power consumption	kW	1.35 (0.55 + 0.80)
Water inlet and outlet connection	inches	male $\frac{3}{4}$ "
Concentrate connection	inches	male $\frac{1}{2}$ "
Reservoir overflow drain connection	mm	32
Weight (empty)	kg	100

*Permeate production results based on following parameters: 1500 mg/l NaCl solution at 10 bars, temperature 10 °C, salt rejection 99.2%, SDI<3 brackish and low-mineralized water.

Requirements:

- Pretreatment required: sediment filtration, iron removal, softening or anti-scalant dosing, adsorption by activated carbon if chlorine presence;
- Required water supply flow rate max 500 liters/hour;
- Drain connection for concentrate discharge;
- Electricity connection socket a 1×230 V/50 Hz/L/N/PE socket (with 16 A fuse);
- Water temperature 0–40 °C;
- Ambient temperature range 0-50 °C.

Additional options:

- Pretreatment system – sediment, iron, organic removal, softening, activated carbon depending on raw water quality;
- Microswitches for pretreatment control;
- Water mineralization and pH adjustment cartridge;
- Antiscalant dosing system.



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