



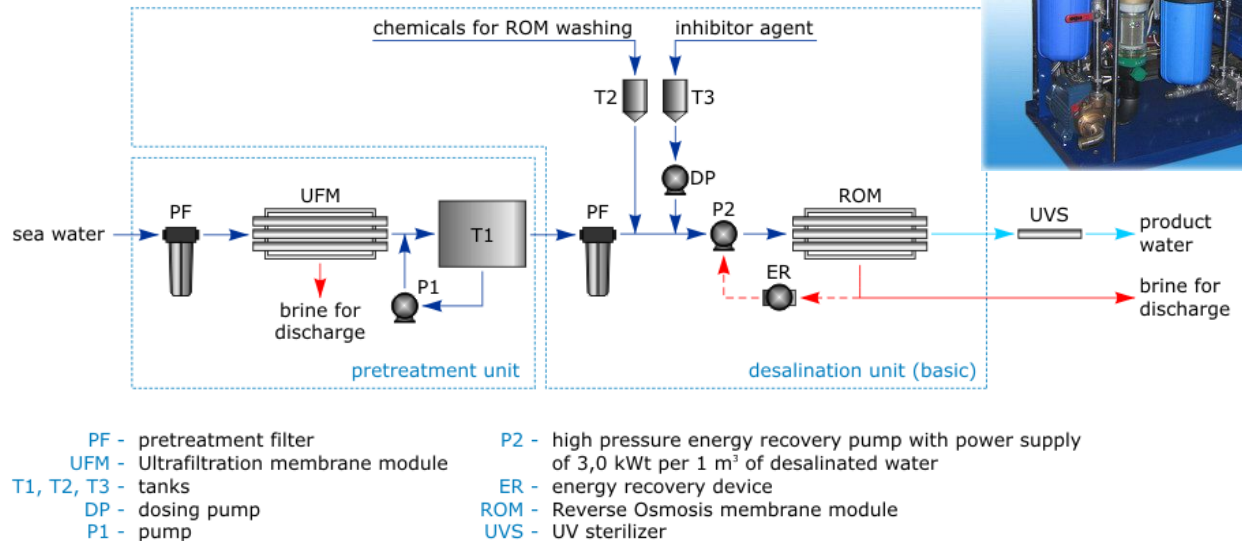
**SEA WATER  
DESALINATION PLANTS**

# SEA WATER DESALINATION PLANT

**DESIGNATION:** high quality fresh water production for potable and technologic purposes from sea water with the initial salinity of up to 45 g/l. Technologic diagram and plant completeness depends on the feeding water type: from the coastal well or the sea.



## TECHNOLOGIC DIAGRAM



### I. Water from a coastal well

Basic processing diagram is applied for water after natural filtration through the ground:

- Pre-treatment unit (PF) with 5 mcm filtration rate;
- Reverse Osmosis membrane desalination unit (ROM, P2) for deep treatment and desalination ;
- Membrane washing unit (T2);
- Inhibitory agent unit for preventing sedimentation (T3, DP).



### II. Sea water

Basic diagram is completed with Ultra-filtration pretreatment module providing the required quality of water fed to the desalination unit,  
 turbidity – max 1,5 mg/l, suspended matters – max 0,1 mg/l, color – max 20 grades, iron – max 0,3 mg/l.

## TECHNOLOGIC DIAGRAM DISCRIPTION

Sea water having passed through the pretreatment filter PF is fed into the Ultrafiltration hollow fiber membrane module to remove suspended matters and colloid impurities, micro-organisms and others. Filtration process is combined with membrane backwash. Such mode promotes high productivity continuous operation without chemical wash.

Afterwards the processed water is fed into the desalination unit ROM, where it is divided into permeate (desalinated water) and concentrate (mineralized and contaminated water) under the operating pressure of 6,0 MPa. Product water is fed to the client and brine is reclaimed (discharged into the sea or pumped into the coastal well – due to the client's demand). Reverse Osmosis membrane desalination unit is equipped with highly productive and modern energy saving pumps «CALDER» with brine energy recovery turbine providing max energy consumption of 3,0 kWt per 1m<sup>3</sup> of desalinated water (for the plants with the capacity exceeding 20m<sup>3</sup>/hour). To prevent sedimentation on the membrane inhibitor agent is added into the initial water from the tank T3 by the dosing pump.

For receiving the water of potable quality the plant is completed with Ultra-Violet sterilizer UVS to prevent secondary biologic contamination and deep water sterilization prior to consumption.

To remove the surplus of boron and bromine (on client's demand) the plant is equipped with the specialized Reverse Osmosis membrane elements with High Rejection towards boron specialized sorption bromine removal unit.

The plant is operated automatically in ON/OFF mode from the water level in the storage tank. Automation system provides control of desalination process basic technologic parameters on the visual control display. Automation system is equipped with light and sound alarm system and unit shut down in emergency cases. Membrane elements chemical wash is executed automatically.

If required the plant is equipped with:

- product water tank;
- product water pumping station.

## REVERSE OSMOSIS DESALINATION ADVANTAGES

Resorts and hotels all over the world rely on highly effective sea water Reverse Osmosis systems for potable and irrigational water direct from the sea.

Reverse Osmosis has a number of advantages over such mineralized water processing technologies as thermal distillation, electro dialysis and ion exchange, namely:



- Easy maintenance of the desalination plant (“push button”);
- The absence of side chemicals during plant operation, as this desalination process completely (or almost) does not require any chemicals application;
- Desalination water higher quality (turbidity always lower 0,1 nephelometer.unit);
- Complete sterilizing after the filtration process.