

**132,000 ~ GPD ( 500 M<sup>3</sup>/day ) Seawater RO Plant  
with Energy Recovery Turbine**



**Made In U.S.A. by 3ET Corporation**

# Seawater Desalination Plant General Specification

\*Desalination plant design will depend on individual customer's requirements.

## Chlorine Dosing System

One metering injection systems will be supplied for controlling different elements in the feed water of the RO plant. The metering pump will allow controlling of different functions such as the stroke length and percentage rate. The Chlorine Dosing System adds chlorine to feed water source, protecting the system from bio-fouling.

## Booster Pump

Delivers feed water to RO plant at 40-50 psi under required feed water flow rate. Grundfos, Tonakflo or others. 316 stainless steel.

## Multi-Media Filter

Multi-media filtration system is used to filter sand and sediment (turbidity) down to approximately 20 Microns. Both automatic and manual backwash option is available. Corrosion resistant, high performance composite & fiberglass tank will be used to hold the media.

## Activated Carbon Filter

Activated carbon filtration system is used to remove chlorine from feed water, which protects TFC membrane from damaging chemical reaction with chlorine. Both automatic and manual backwash option is available. Corrosion resistant, high performance composite & fiberglass tank will be used to hold the media.

## Pre-Filtration System

5 micron cartridge type sediment filter further reduces suspended solids in the feed water stream to RO system.

## Sodium Metabisulfite Dosing System

One metering injection systems will be supplied for controlling different elements in the feed water of the RO plant. The metering pump will allow controlling of different functions such as the stroke length and percentage rate. The Sodium Metabisulfate Dosing System neutralizes chlorine, which is added in the feed water to reduce bacteria. The residual serves as an excellent biocide, which prevents membranes from bio-fouling.

## Acid Dosing System

One metering injection systems will be supplied for controlling different elements in the feed water of the RO plant. The metering pump will allow controlling of different functions such as the stroke length and percentage rate. The Chemical Dosing System prevents membrane scaling.

## Antiscalant Dosing System

One metering injection systems will be supplied for controlling different elements in the feed water of the RO plant. The metering pump will allow controlling of different functions such as the stroke length and percentage rate. The Antiscalant Dosing System prevents the membrane from scaling.

## Caustic Dosing System (Post Treatment)

One metering injection systems will be supplied for controlling different elements in the product water of the RO plant. The metering pump will allow to control different functions such as the stroke length and percentage rate. The Caustic Dosing System adjusts product water pH.

## Chlorine Dosing System (Post Treatment)

One metering injection systems will be supplied for controlling different elements in the product water of the RO plant. The metering pump will allow to control different functions such as the stroke length and percentage rate. The Chlorine Dosing System sterilizes product water.

## UV Sterilization System (Post Treatment)

Sterilizes product water by alternating the DNA structure inside bacteria.

## Ozone System (Post Treatment)

Sterilizes product water by burning off the outer membrane of bacteria.

## RO System :

- 1. Membrane Housing:** corrosion resistant, fiberglass construction, 1000 psi rating.
- 2. Membranes:** Dow Filmtec or Fluid Systems seawater, TFC membranes.
- 3. High pressure RO Pump:** On smaller units. CAT 316 SS plunger pump or equivalent. On larger units ZYI uniquely design pumping system, including multi-stage centrifugal pump, energy recovery turbine, and variable frequency drive, making it one of the highest quality, quietest, and most efficient pump system available on the market today.
- 4. Motor :** 415V/380V/230V/208V/120V, 50hz/60hz, single phase or three phase
- 5. High pressure side piping material :** 316 SS
- 6. Low pressure side piping material :** schedule 80 PVC
- 7. Concentrate control valve:** 316 stainless steel
- 8. Water quality monitor:** seawater and product water digital TDS meter, seawater and product water pH meter, ORP meter. Ashcroft, Marshal, Signet, Fisher or equivalent.
- 9. Flow meters:** Panel Mount Digital Flow Meters or rotameter for feed water and product water
- 10. Pressure Gauges:** on the inlet and outlet of every filtration stage, and before and after each RO membrane vessel.
- 11. System controls (automatic or manual operation):**

- **PLC control** to provide start/stop, sequential, and alarm control.
  - **RO System start permissible conditions :**
    1. Power On
    2. Start button pushed
    3. low pressure switch closed
    4. permeate water tank level below low level ( low and high level switches are on open position)
    5. Raw water tank water level switch closed
- Six conditions will cause the RO to shut down the machine:
1. high working pressure,
  2. low inlet pressure (<20 psi)
  3. starter overload trip
  4. raw water storage tank level low
  5. product water storage tank level high
  6. emergency shut-down button pushed.
- Low Feed Pressure Shut Off with indicator light
  - High pressure shut-off switch
  - Product Water and raw water Tank level control
  - System On switch with light
  - Power On switch with light
  - Mimic panel (twin led type)
  - PH Audio and visual alarm
  - ORP Audio and visual alarm
  - Brine flow audio and visual alarm
  - Feed water Temperature audio and visual alarm
  - High TDS diversion
  - High turbidity diversion

## Membrane Cleaning/Flushing System

Includes high flow pump, 316 SS, heater. It cleans membranes when needs, extends membrane life. Use chemicals for cleaning. Automatic cleaning/flushing. Installed with automation, valves. Etc. With common service tank for product/cleaning/flushing. The cleaning system has pressure transmitter at In/Out of each membrane vessel. If Delta P is greater than design Delta P, then audio and visual alarm will trigger.

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# IDRO Specification

## OPERATING PARAMETER

Operating pressure : 180 - 220 psig (12.4 - 15.2 bar)

Minimum inlet pressure : 30 psig ( 2.1 bar )

Operating temperature: 40-85 °F (4-29 °C)

## NOMINAL MACHINE IONIC REJECTION

95%-98%

## MEMBRANE HOUSING

304SS OR fiberglass

## CONNECTIONS

Inlet, permeate, and concentrate are PVC SOC type connections

## STANDARD ECONOMY (ECN) FEATURES

Energy saving membrane elements  
SS high-pressure pipework  
5-micron pre-filter and SS housing  
Automatic inlet shut-off valve  
Level control  
Automatic flush system  
Pre-filter, post-filter, primary, and final pressure gauges  
Permeate and concentrate flow meters  
Digital conductivity meter  
External control capabilities  
ALARMS : Low inlet pressure, starter overload trip, high permeate conductivity

## FRAME

Powder coated carbon steel

## CONTROL CIRCUIT

110VAC, single phase, 60 hz or 220VAC, single phase, 50 Hz

## PUMPS

Mutli-stage, centrifugal pump

## MOTORS

3-phase , TEFC, 460VAC, 60Hz or  
3-phase, TEFC, 380VAC, 50Hz

## DELUXE (DLX) FEATURES - in Addition to ECN Features

Digital pH controller system  
Chemical dosing system  
Clean-in-place pump plumbed, wire and mounted; remote tank  
Permeate purge  
Permeate purge disable capabilities  
ALARM(S): High permeate pressure, high/low pH

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