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## 5000L/H 2 Stage Integrated Container RO Water Purification Plant

### 1. Design basis and treated water standard:

#### 1. Design Basis

1.1 Raw water: **Well water**

1.2 Produced water's application: **Drinking water.**

1.3 2 Technical indicators of water production:

1.4 Water production: **1<sup>st</sup> stage RO 7500L/h ; 2<sup>nd</sup> stage RO 5000L/h**

1.5 System Configuration: Pretreatment + One Stage Reverse Osmosis Desalination System.

1.6 Designed recovery: **1<sup>st</sup> stage RO  $\geq 65-70\%$ ; 2<sup>nd</sup> stage RO  $\geq 75\%$**

1.7 Rejection rate:  **$\geq 98\%$**

1.8 Voltage: 3 phases, 380V, 50Hz; Power: 20KW

### 2. System requirements:

2.1 Inlet pipelines: inlet pipe connected with the raw water tank entrance.

2.2 Cable: According to the calculated capacity of electric power, the user should send it on the control cabinet.

2.3 Outlet water pipelines: From pure water tank to the pure water using point.

2.4 Concentrated Water Treatment: Discharge to the wastewater pool (user considered).

2.5 Water temperature: 5-35°C

### 3. Process:

Wall water → Raw water booster pump → Mechanical filtration → Activated carbon filtration → Security filter → Primary high pressure pump

→ First Stage RO system → Middle water tank → Secondary high pressure pump → Secondary Stage RO system → Water point

### 4. Systems Manual

This system uses mechanical filtration and activated carbon filtration as the pre-treatment to effectively remove suspended solids in the raw water,

For impurities such as sediment particles, organic colloids, organic matter, peculiar smell, residual chlorine, etc., the program-controlled reverse osmosis device is used as pre-desalination to remove most of the soluble



salt substances, bacteria, heat source, etc. in the raw water to ensure that the quality of the finished water meets the standard.

The system has two modes: automatic and manual. The self-defined program control system adopts traditional relay as the central control element, and realizes the automatic operation of the system through the combination of multi-point multi-channel water level sensor and dynamic pressure controller. Manual mode can be used for installation, debugging and maintenance or when the automatic control system fails.

Under normal circumstances, the system can run continuously when placed in automatic operation mode, automatically monitor water quality, and operate Simple operation, stable operation, safe and reliable.

## 5. Process Description:

**The process includes pretreatment, reverse osmosis system, and post treatment (Ozone generator)**

### 1) Raw water pretreatment part:

Raw water contains many impurities, such as suspended solids, colloidal, organic and inorganic. To ensure Reverse Osmosis Desalination System at normal operation, the suspended solids, colloids, organic matters must be removed in advance, so that feed water to reverse osmosis system meets the requirement. So, the pretreatment part should be equipped. The pretreatment part includes: Mechanical Filter, Activated Carbon Filter and Security Filter.

#### (1) Mechanical filter:

Reverse osmosis equipment has the high requirement to the turbidity of the feed water, especially reverse osmosis water's pollution index value requests less than 4 SDI and turbidity less than 1NTU. Multi-media filter filled with several specification quartz sand, which remove suspended solids, colloid from raw water.

#### (2) Activated Carbon Filter:

Reverse osmosis equipment requests residual chlorine content be less than 0.1mg / L, so used activated carbon filter removing chlorine from raw water avoiding reverse osmosis membrane getting contamination. Meanwhile, it can adsorb organic matter in raw water. Activated carbon filter inside filled with the coconut shell refined activated carbon, for adsorbing the chlorine, organic matter, some pigments and harmful substances, reducing the chemical oxygen demand( COD).

Activated carbon is widely used in life water, the food industry, chemical and other industries. Due to large specific surface area and the surface covered with lots of micropores, therefore, activated carbon with high adsorption capacity.

#### (3) Security filter:

Security filters are micro-filtration equipment, playing the insurance role in the pretreatment, to prevent the particles into the water pump and reverse osmosis system.

### 2) Reverse osmosis desalination parts:

Water reverse osmosis unit can remove most of inorganic salts, particles, bacteria, viruses, heavy metals, and other soluble substances.

The rejection rate can reach 98%. It is simple, low energy consumption, non-pollution, etc, so, it is widely used for producing pure water.

## 6. Main Components List:



| No | Item  | Material        | Model           | Qty           | Remark                          |
|----|---|-----------------|-----------------|---------------|---------------------------------|
| 1  | Booster pump                                      | SUS304          | CDL16-30        | 1Pcs          | Voltage 380V power 3KW          |
| 2  | Mechanical filter                                 | Stainless steel | 1000*1800       | 1Set          | Quartz sand 1500 kg             |
| 3  | Activated carbon filter                           | Stainless steel | 1000*1800       | 1Set          | Activated carbon 450 kg         |
| 4  | Electromagnetic valve                             | Copper          | DN50            | 1Pcs          |                                 |
| 5  | Security filter                                   | SUS304          | 40"×5core       | 1Set          | 5pcs 40"PP filter element       |
| 6  | <b>1<sup>st</sup> stage</b><br>High-pressure pump | SUS304          | CDL16-120       | 1Pcs          | Voltage 380V power 11KW         |
| 7  | <b>1<sup>st</sup> stage</b> RO Membrane           | Polyamide       | BW-8040         | 6 Pcs         |                                 |
| 8  | Middle water tank                                 | SUS304          | 3M <sup>3</sup> | 1 Pcs         | 3 imported liquid level sensors |
| 9  | Pressure vessel                                   | Stainless steel | 8040×2M         | 3 Set         |                                 |
| 10 | <b>2<sup>st</sup> stage</b><br>High-pressure pump | SUS304          | CDL8-160        |               | Voltage 380V power 5.5KW        |
| 11 | <b>2<sup>st</sup> stage</b> RO Membrane           | Polyamide       | BW-8040         | 4 Pcs         |                                 |
| 12 | Pressure vessel                                   | Stainless steel | 8040×2M         | 2 Set         |                                 |
| 13 | Flowmeter   | Plexiglass      | 35GPM           | 2 Pcs         |                                 |
| 14 | Pipes and fittings                                | SUS304          |                 | 1 Batch       |                                 |
| 15 | Electric control box                              | LS PLC          |                 | 1 Set         |                                 |
| 16 | Main Frame  | Stainless steel |                 | 1 Pcs         |                                 |
| 17 | Conductivity meter                                |                 | CM230           | 2 Pcs         |                                 |
| 18 | Ball valve  | SUS304          | DN32、25         | 2 Pcs         |                                 |
| 19 | Meter   | SUS304          | 1.0、2.5MPa      | Each<br>2 Pcs |                                 |



## 7. Picture









