

### Basic Information

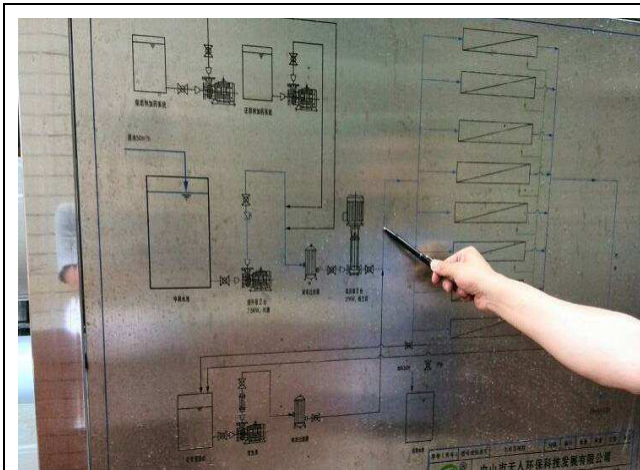
<b>Application</b>	Reverse Osmosis System (RO) – Waste Water Treatment		
<b>Customer</b>	PCB Manufacturer		
<b>Location</b>	ZhongShan, Guangdong, China		
<b>Evaluation Period</b>	28 April, 2014 to 22 May, 2014.		
<b>Objective</b>	Improve the flow rate of water output		
<b>Current Issue</b>	The existing RO membrane is consistently clogged by scale. Related flow rate can achieve 34% only which highly affected the productivity of the RO system.		
<b>RO Performance on Flow Rate</b>	<b>Default Flow Rate</b>	<b>Lowest Flow Rate</b>	<b>Highest Flow Rate</b> (After Chemical Wash)
	25 tonnes / hour (100%)	8.5 tonnes / hour (34%)	12 tonnes / hour (48%)
<b>Model in use</b>	Hydropath S60 (used)		
<b>Location of installation</b>	the pipeline after the pump and before the RO Membrane (see pictures)		

### Data of Performance

Date	Installation Status	RO Water Output (T/h)	RO Concentrated Water	RO Output Water Conductivity (um/cm)	RO Concentrated Water Pressure (MPa)	Water Pressure after High Pressure Pump (MPa)
28/4/2014	Membrane chemical washed, HP Installed	12	17	45.8	1.3	1.3
29/4/2014	HP Installed	18.5	15	17.2	1.15	1.22
1/5/2014	HP Installed	22	15	16.5	1.12	1.17
13/5/2014	HP Disconnected	24	14.5	15.6	1.1	1.13
22/5/2014	HP Disconnected	24	15	16.75	1.17	1.19

## Benefits Evaluation

Description	Before	After	Benefits
<b>RO Water Output (T)</b> - Per hour - Per year	12T 103,680T	24T 207,360T	50% productivity improved; <i>102,680 tonnes</i> of RO water increased.
<b>Energy Saving (kWh)</b> - Based on 207,360 T Water Output - High Pressure Pump Energy Consumption : 20kWh	345,600kWh	172,800kWh	50% Energy saved; <i>172,800 kWh</i> saved.
<b>Concentrated Water Reduction (T)</b> - Per hour - Per year	17T 146,880T	15T 129,600T	11.8% Concentrated Water reduced; <i>17,280 Tonnes</i> water saved.
<b>Conductivity Improvement (um/cm)</b>	45.1	15.6	<i>65.4%</i> improved; As the output water will be used for the Water Cooling System, lower conductivity can also reduce the scaling issue of the cooling water system.
<b>Product Life Extension of Membrane</b> - Periodic cleaning by chemical	2 weeks	6 weeks or longer	<i>66%</i> chemical cleaning reduce; <i>66%</i> of chemical can be reduced; Prolong the life time of membrane from corrosion during chemical wash.



**Installation Location**

**Install of Hydropath**



**22/5/2014 Water Output : 24t/hour**

**22/5/2014 Concentrated Water : 15t/hour**



**22/5/2014 Conductivity : 16.75**

**22/5/2014 Pressure : 1.17/1.19**