

Portable Reverse Osmosis System

INRO 20~200ton



Address : A-301 Hage Technotown, 10, Nowon-gu, Seoul, Korea
Tel : 08-2-948-0657 Fax : 82-2-948-2342
<http://www.waco.co.kr>

CONTENTS

1. INTRODUCTION

- 1.1 Proposal basis
- 1.2 Product goals

2. RAW WATER ANALYSIS

3. WATER TREATMENT TECHNOLOGY

- 3.1 Technology: REVERSE OSMOSIS(R/O) MEMBRANE FILTRATION
- 3.2 Understanding R/O membrane filtration with comparative data

4. ORGANIZATIONAL PORTABLE R/O SYSTEM (STRUCTURE)

- 4.1 SPEC(Components)
- 4.2 Features of Components

5. CAPACITY AND SPEC OF WATER TREATMENT SYSTEM (10ton~200ton)

- 5.1 Capacity and Spec
- 5.2 Spec for filters and housings

6. Flow sheet for river water and underground water (for only reference)

7. Simulation for treated water system

8. Container

1. INTRODUCTION

1.1 Proposal basis

1 This Portable WATER TREATMENT SYSTEM based on REVERSE OSMOSIS(R/O) TECHNOLOGY is designed to produce safe drinking water from the regional water source- Underground water or other tap water.

1.2 Product goals

We have supplied our Potable R/O Treatment systems to our local and worldwide distributors and installed our equipments to their designated sites by ourselves over many years.

Based on those experiences we are familiar with those industrial zones's circumstances and regional conditions to provide Proper treatment systems in order to meet their demand for safe treated water.

Accordingly, our ultimate goal is to produce the right system to our esteemed distributors based on our long field experience and high technical systems for the safe drinking water.

1. INTRODUCTION

- 1) Reverse Osmosis(R/O) membrane filtration removes those many kind of dangerous bacteria and heavy metals .
Other natural filtration system without any membrane or UF membrane with pore size of 0.01 μ m is impossible to remove those harmful elements and various kind of bacteria however Specially R/O membrane filtration system with pore size of 0.001~0.0001 μ m with high reduction rate can eliminate those germs, heavy metal, agrichemical elements up to 95~99% for safe-clean water production.
- 2) High effective Pre-filtering systems with water softner sys before R/O system,
- 3) UV sterilizer prevents secondary pollution of bacteria for safe water
- 4) CIP system or Anti-scalant sys supports R/O filtering effect and service life.
- 5) Compact system : Easy to movement of the system with skid open type case,
- 6) Possible to produce treated water immediately after connecting IN/OUTLET DRAIN pipes
- 7) Automatic operation management system by PLC Controller and Easy Programming by the display of the system operation

2. RAW WATER ANALYSIS

▷ Underground water or other possible source

3. WATER TREATMENT THCHNOLOGY

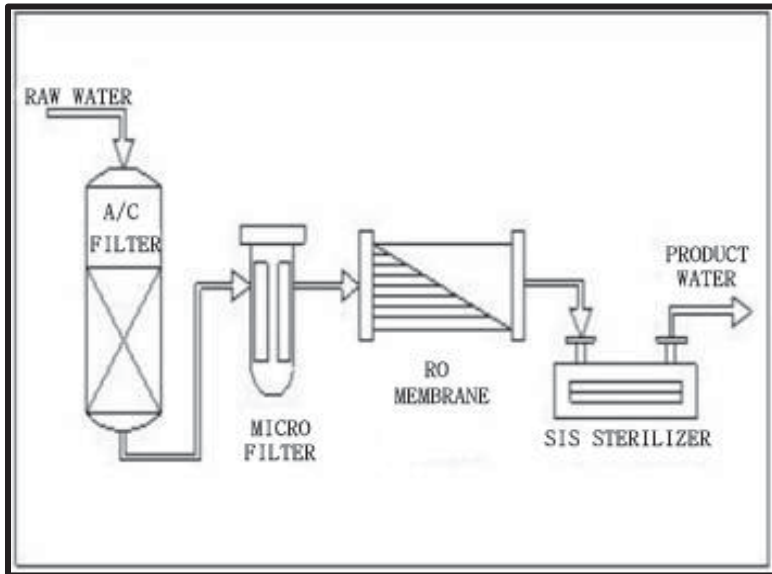
3.1 Technology : REVERSE OSMOSIS(R/O) MEMBRANE FILTRATION

ITEM		R/O	NF/UF	OTHERS (NATURAL FILTRATION)
Market Share(%)		90%	5%	5%
WATER PRODUCTION CAPACITY		Rather Little	Much	Much
Membrane pore		0.001~0.0001 μ m	0.01~0.001 μ m	0.1 μ m(Electrolysis)
Comparison Clean Water Quality	Mineral Ion, Heavy Metal	About 95% Removal	About 40~60% Removal	No Removal
	Bacteria, Germ, Virus, Corpuscle	About 95~99% Removal	About 80~90% Removal	Partial Removal
	Acidity	Acidity Water	Neutrality Water	Neutrality Water
Comparison Membrane Performance		Weak From Scale Component and Chlorine	Strong From Scale Component and Chlorine	Weak From Scale Component (Electrolysis)

3. WATER TREATMENT THCHNOLOGY

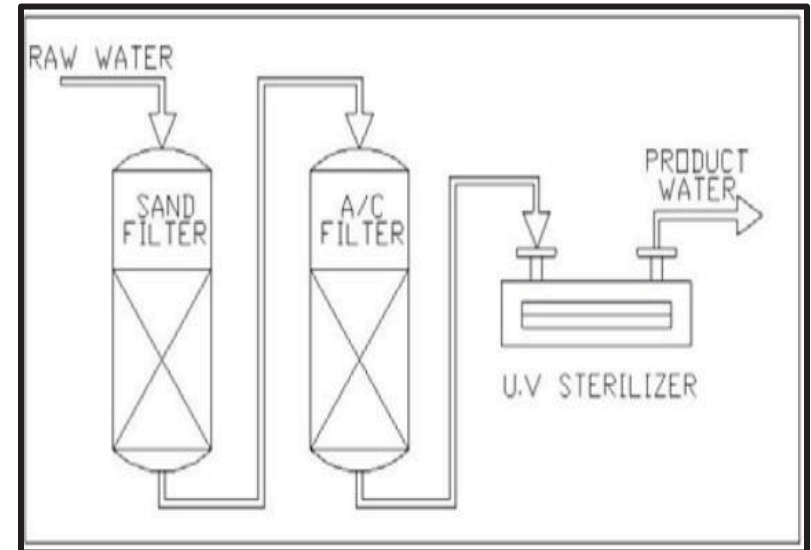
3.2 Understanding R/O membrane filtration with comparative data

1) RO MEMBRANE FILTRATION



- *Regular pressure is needed (about 3.0 ~ 10Kg/cm².g)
- *Produce clean-safe drinking water from any possible water source for instance-Any mud water, Underground water, River water
- *Remove heavy metal, agrichemical elements, muddiness, and etc.
- *Easy to manage water source change

2) Natural filtration w/o any membrane



- *Able to operate by natural pressure (tap water pressure)
- *Impossible to remove harmful elements as heavy metal, agrichemical elements
- *Simple equipment is required with lower price
- *Impossible to produce any clean-safe drinking water for human body

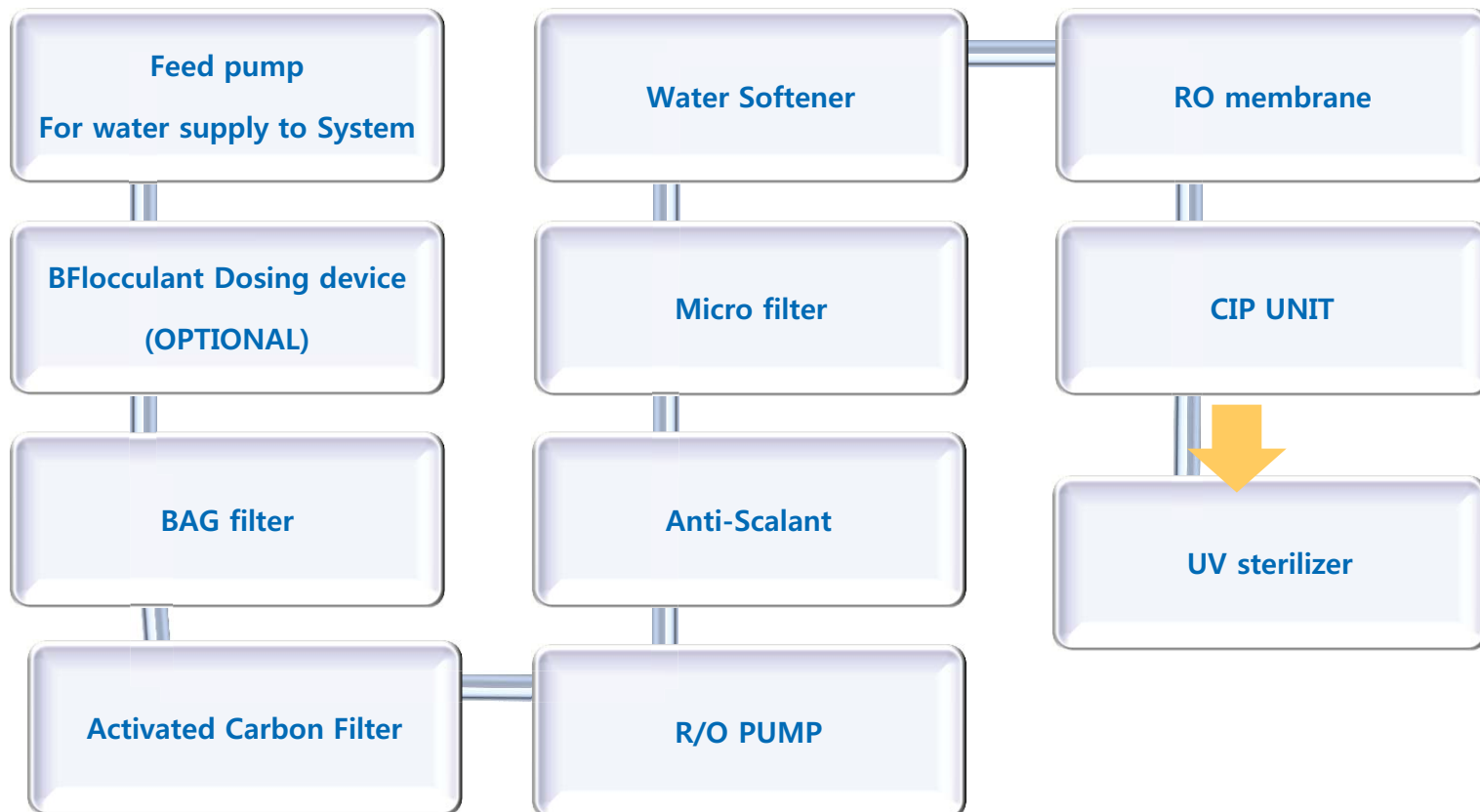
4. ORGANIZATIONAL PORTABLE R/O SYSTEM (STRUCTURE)

4.1 SPEC (Components)

NO.	ITEM	COMPONENT	River water	Underground water
1	Feed pump		○	○
3	Flocculant (polymer) Dose Device		OPTIONAL	OPTIONAL
4	BAG FILTER		○	○
5	Activated Carbon filter		○	○
6	Water Softner filter		○	○
7	Micro filter		○	○
8	Anti-Scalant		○	○
9	R/O PUMP		x	○
10	R/O MEMBRANE FILTER		○	○
11	R/O VESSEL		○	○
12	CIP UNIT		○	○
13	UV sterilizer		x	○
14	PLC & LCD		○	○

4. ORGANIZATIONAL PORTABLE R/O SYSTEM (STRUCTURE)

- ▷ Both Automatic control valve and Manual control valve for filters and water softener are available for the Regional Power supply condition



4. ORGANIZATIONAL PORTABLE R/O SYSTEM (STRUCTURE)

4.2 Features of components

No.	Feature of System	Status
1	<p>Raw Water Feed pump Device to force water in raw water tank to flow into R/O system</p>	For common use
2	<p>Washable bag filter Device to purge the collected mud(silt) or floating substances which exist in raw water as a pre-filter •Effective to muddy river water or underground water</p>	For common use
3	<p>Activated Carbon Filter Device to remove many kinds of organisms, smell, and taste that exist in raw water and also remove various kinds of small substances, impurities, etc</p>	For common use
4	<p>Water Softener Device to remove hardness (Ca, Mg) in the water by using Na type of strong acid positive ion-exchange resin. It can be continually usable with 10% common salt by the regeneration</p>	For common use

4. ORGANIZATIONAL PORTABLE R/O SYSTEM (STRUCTURE)

No.	Feature of System	Status
5	<p>Micro Filter Device to remove secondary 1~5micron size floating substances and turbidity which remain in primary filtered raw water through Bag filter, Carbon filter, Softener,</p>	For common use
6	<p>Anti-Scalant unit Device to prevent fouling effect of RO membrane's surface. This system doses raw water with Anti-Scanlant solution in pre-treated stages to minimizes these matters,</p>	For common use
7	<p>RO pressure pump Device to pressurize pre-treated raw water to RO system</p>	For common use
8	<p>RO Membrane As a final stage filtering system, remove smallest particles, impurities(0.001~0.0001mirco size), remain calcium after water softener, Heavy metal(Arsenic, Lead, etc) many kind of bacterias,</p>	

4. ORGANIZATIONAL PORTABLE R/O SYSTEM (STRUCTURE)

No.	Feature of System	Status
9	<p>C.I.P (Cleaning In Place) Removal of RO membrane's fouling effect , This membrane fouling causes lower production, lower removal rate and different pressure due to hydrate of oxidized metal substance, calcium sediment, organism, and microbe</p>	For common use
10	<p>UV STERILIZER Device to prevent any possible secondary pollution of treated water in storage tank through the final filtering system of R/OMembrane filter,</p>	For common use
11	<p>PLC & LCD Micro Computer to control automatically the whole progress of the water purification system from Raw water tank through Water filtration system to storage tank</p>	For common use

5. CAPACITY AND SPEC OF COMPONENTS(20~200 TON)

5.1 Capacity and SPEC of Components

The SPEC could be revised by the regional water condition or demand

MODEL	Production (D)	LAWWATER FEED PUMP	BAC FILTER(10micron)	CARBON FILTER(8*30mesh)	Water Sofetner
INRO-20	20 m ³ /day	1.8 m ³ /HR*3.0kgf/cm ²	1BF1(Φ216*500)25A/30 m ³ /HR	#2062(150L)25A	#2062(150L)25A/3.8 m ³ /HR
INRO-30	30 m ³ /day	2.5 m ³ /HR*3.0kgf/cm ²	1BF1(Φ216*500)25A/30 m ³ /HR	#2262(200L)40A	#2262(200L)40A/6.5 m ³ /HR
INRO-40	40 m ³ /day	3.5 m ³ /HR*3.0kgf/cm ²	1BF1(Φ216*500)25A/30 m ³ /HR	#2262(200L)40A	#2262(200L)40A/6.5 m ³ /HR
INRO-50	50 m ³ /day	4.5 m ³ /HR*3.0kgf/cm ²	1BF1(Φ216*500)25A/30 m ³ /HR	#2472(300L)40A	#2472(300L)40A/7.5 m ³ /HR
INRO-60	60 m ³ /day	5.0 m ³ /HR*3.0kgf/cm ²	1BF1(Φ216*500)25A/30 m ³ /HR	#2472(300L)40A	#2472(300L)40A/7.5 m ³ /HR
INRO-70	70 m ³ /day	6.0 m ³ /HR*3.0kgf/cm ²	1BF1(Φ216*500)25A/30 m ³ /HR	#2472(300L)40A	#2472(300L)40A/7.5 m ³ /HR
INRO-80	80 m ³ /day	7.0 m ³ /HR*3.0kgf/cm ²	1BF2(Φ216*810)50A/54 m ³ /HR	#3072(500L)50A	#3072(500L)50A/8.5 m ³ /HR
INRO-90	90 m ³ /day	8.0 m ³ /HR*3.0kgf/cm ²	1BF2(Φ216*810)50A/54 m ³ /HR	#3072(500L)50A	#3072(500L)50A/8.5 m ³ /HR
INRO-100	100 m ³ /day	8.5 m ³ /HR*3.0kgf/cm ²	1BF2(Φ216*810)50A/54 m ³ /HR	#3072(500L)50A	#3072(500L)50A/8.5 m ³ /HR
INRO-200	200 m ³ /day	20 m ³ /HR*45M 5HP	1BF2(Φ216*810)50A/54 m ³ /HR	#3572(700L)50A	#3572(700L)50A/9.0 m ³ /HR

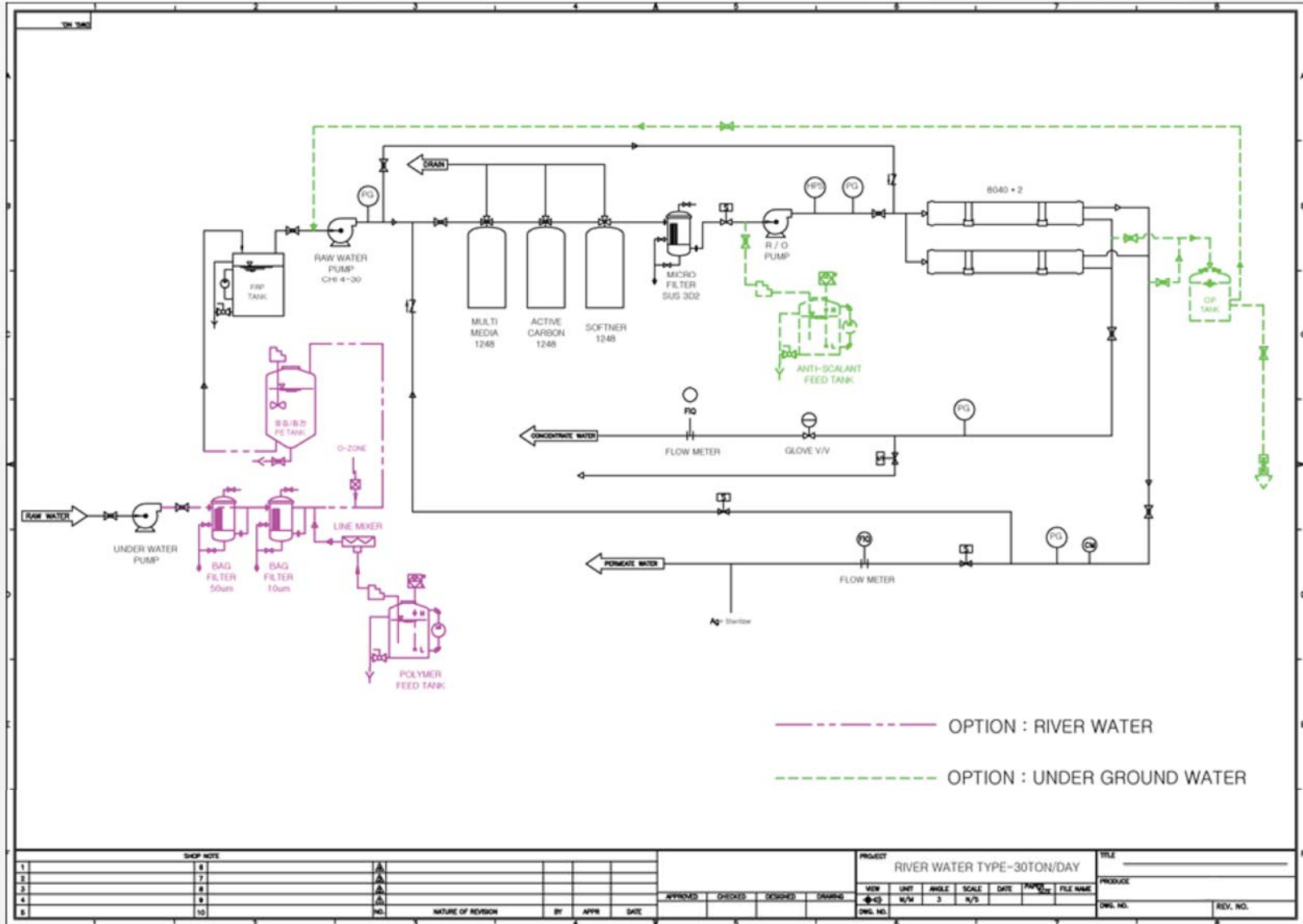
5. CAPACITY AND SPEC OF COMPONENTS(20~200 TON)

5.2 SPEC OF COMPONENTS

The SPEC could be revised by the regional water condition or demand

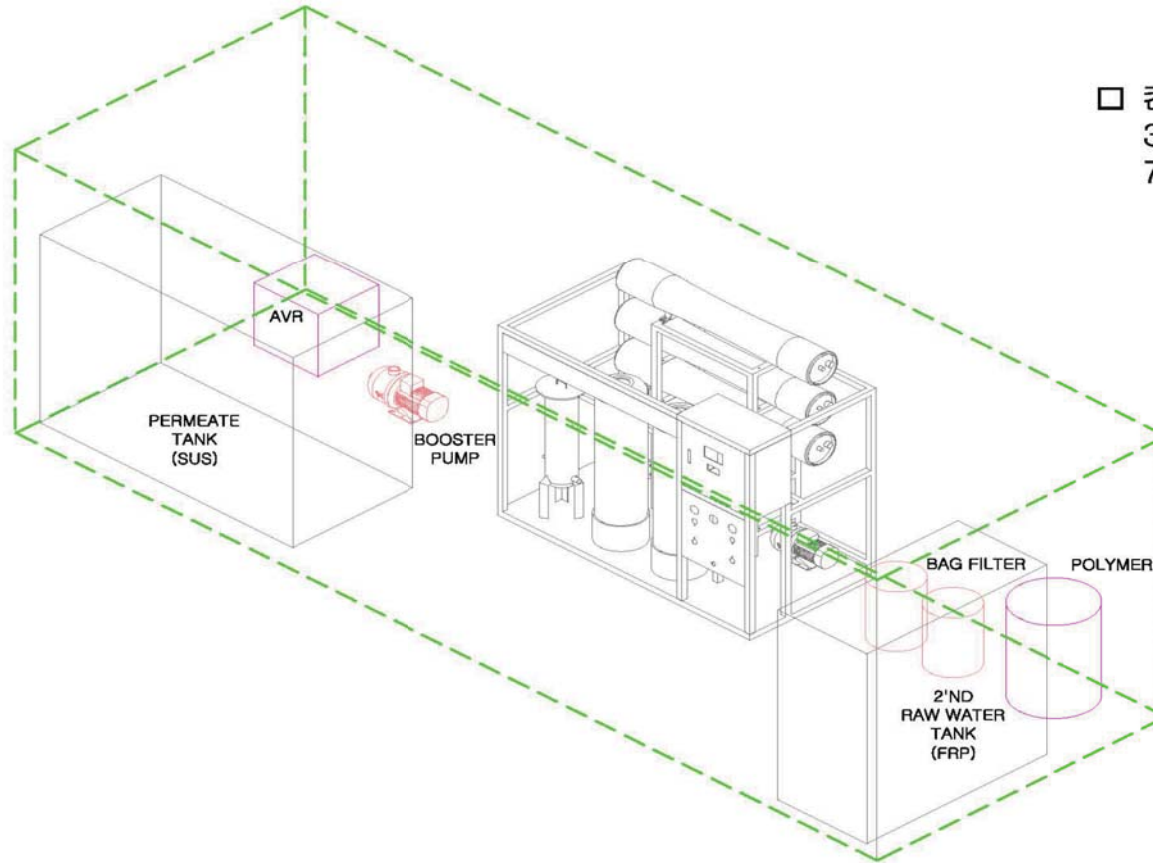
MODEL	MICRO FILTER(5micron)	R/O PUMP	R/O MEMBRANE	R/O VESSEL	CIP UNIT	UV Steralizer
INRO-20	3D2(Φ190*1000)25A/3~5m ³ /HR	1.8m ³ /HR*7.5~8.5kgf/cm ²	RE4040-5	#SUS 4040(1단)-5	0.8m ³ /HR*3.0kgf/cm ²	6GPM-20W*1
INRO-30	3D2(Φ190*1000)25A/3~5m ³ /HR	2.5m ³ /HR*7.5~8.5kgf/cm ²	RE4040-6	#SUS 4040(1단)-6	1.1m ³ /HR*3.0kgf/cm ²	6GPM-20W*1
INRO-40	3D2(Φ190*1000)25A/3~5m ³ /HR	3.5m ³ /HR*7.5~8.5kgf/cm ²	RE4040-8	#FRP 4040(2단)-4	1.8m ³ /HR*3.0kgf/cm ²	6GPM-20W*1
INRO-50	4D2(Φ216*1000)40A/4~6m ³ /HR	4.5m ³ /HR*7.5~8.5kgf/cm ²	RE4040-10	#FRP 4040(2단)-5	2.5m ³ /HR*3.0kgf/cm ²	6GPM-20W*1
INRO-60	4D2(Φ216*1000)40A/4~6m ³ /HR	5.0m ³ /HR*7.5~8.5kgf/cm ²	RE8040-3	#FRP 8040(1단)-3	3.5m ³ /HR*3.0kgf/cm ²	12GPM-39W*1
INRO-70	4D2(Φ216*1000)40A/4~6m ³ /HR	6.0m ³ /HR*7.5~8.5kgf/cm ²	RE8040-4	#FRP 8040(1단)-4	4.5m ³ /HR*3.0kgf/cm ²	12GPM-39W*1
INRO-80	6D2(Φ260*1000)50A/6~12m ³ /HR	7.0m ³ /HR*7.5~8.5kgf/cm ²	RE8040-4	#FRP 8040(1단)-4	5.0m ³ /HR*3.0kgf/cm ²	12GPM-39W*1
INRO-90	6D2(Φ260*1000)50A/6~12m ³ /HR	8.0m ³ /HR*7.5~8.5kgf/cm ²	RE8040-5	#FRP 8040(1단)-5	6.0m ³ /HR*3.0kgf/cm ²	24GPM-39W*2
INRO-100	6D2(Φ260*1000)50A/6~12m ³ /HR	8.5m ³ /HR*7.5~8.5kgf/cm ²	RE8040-6	#FRP 8040(2단)-3	7.0m ³ /HR*3.0kgf/cm ²	24GPM-39W*2
INRO-200	12SL2(Φ360*1150)65A/12~20m ³	20m ³ /HR*150M 15HP	RE8040-10	#FRP 8040(2단)-5	8.0m ³ /HR*3.0kgf/cm ²	24GPM-39W*2

6. FLOW SHEET CONSIDERING BOTH RIVER WATER AND UNDERGROUND WATER

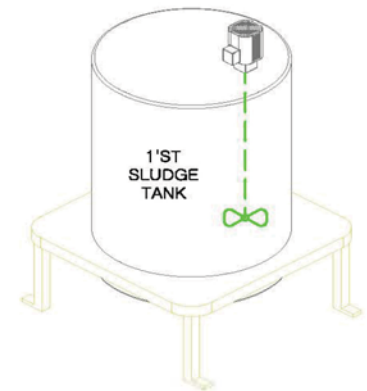


SHOP NOTE				PROJECT				TITLE				
1	4			RIVER WATER TYPE-30TON/DAY								
2	7							PRODUCE				
3	8											
4	9											
5	10											
NATURE OF REVISION				BY	APPN	DATE	APPROVED	CHECKED	DESIGNED	DRAWING	DWG. NO.	REV. NO.

7. SIMULATION FOR THE TREATED SYSTEM WITH OTHER CONNECTION PARTS



- 컨테이너 내부 배치도
- 30 ~ 60 TON : 20FIT
- 70 ~ 100 TON : 40FIT



SHOP NOTE				PROJECT				TITLE				
1	6			컨테이너 내부 배치도								
2	7			VIEW	UNIT	ANGLE	SCALE	DATE	PRG	FILE NAME	PROCESS	
3	8			3	M/M	3	N/S				DWG. NO.	REV. NO.
4	9			APPROVED								
5	10			NO. NATURE OF REVISION BY APPR DATE								

8. CONTAINER

20" and 40" commercial containers will be modified and provided to house the water Treatment systems and relevant equipments. 20" feet containers will be used for the systems of the capacities of up to 50tons per Day and 40"feet containers will be done for the systems of the capacities of up to 100 Tons per day system.

a.

