



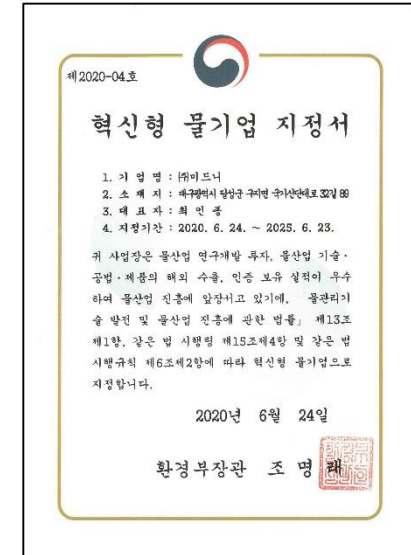
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Foundation	Mar. 2010
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Factory, R&D	89, Gukgasandan-daero 32-gil, Guji-myeon, Dalseong-gun, Daegu
Business Activities	Water Disinfection Ground Water Treatment Industrial Water Treatment Industrial System Solution



Specialized in Water Treatment Solution and Products

History

- 2020 06 Innovative water company certified by Ministry of Korea Environment
- 2109 11 Acquired Patents for Channel type UV Disinfection Unit
05 Acquired Patents for Candle type Back wash filter system
- 2018 09 New Factory at Daegu (National Water Cluster)
05 Acquired Inno-Biz Certificate
- 2017 11 Acquired Main-Biz Certificate
06 Acquired Patents for Back wash filter system of 2 step filtration
- 2016 11 Export Frontier Enterprise Certified
10 A Member of Korean Water Cluster Conference
06 Acquired Patents for TiO2 Coating from Korea Institute of Materials Science
- 2014 07 Opened R&D Center
05 New Factory at GwangJu City, Gyeonggi-do
01 Registered as Venture Company by Korea Technology Finance Corporation
- 2013 12 Acquired Patents for MDUV Disinfection Unit
- 2012 07 Acquired Patents for Groundwater Treatment for Norovirus Disinfection
05 Acquired ISO9001 & ISO14001 Certificates
- 2011 10 Partnership agreement with Atlantium Technology Ltd. / Israel
09 Certification for Norovirus Inactivation by AOT – First time in Korea
- 2010 05 Partnership agreement with Wallenius Water AB / Sweden
03 Foundation of Midni Co., Ltd. (Managing Director In-Jong Choi)



Corporate Mission & Working Principle

We respect and deliver the value of trust, and
Contribution to everyone' s clean and green life.

- S** Systematic We know the end when we start
- M** Maintainable Long lasting approach
- A** Artistic Beyond Expectation and Professional
- R** Reliable Mutual Trust and Reliability
- T** Transparency Business Integrity, Moral & Ethics



Patent & Certificate



Patent I
Norovirus Disinfection



Patent II
Groundwater Treatment



Patent III
UV Disinfection



Patent IV
TiO2 Coating



Patent V
Auto Backwash Filter



Patent VI
Channel Type UV



Patent VII
Auto Backwash Filter II



Performance Certificate



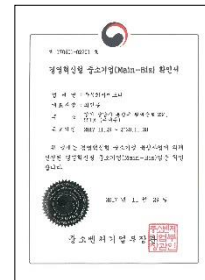
ISO 9001



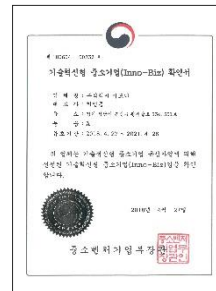
ISO 14001



Export Frontier



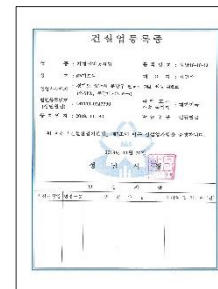
Main Biz



INNO Biz

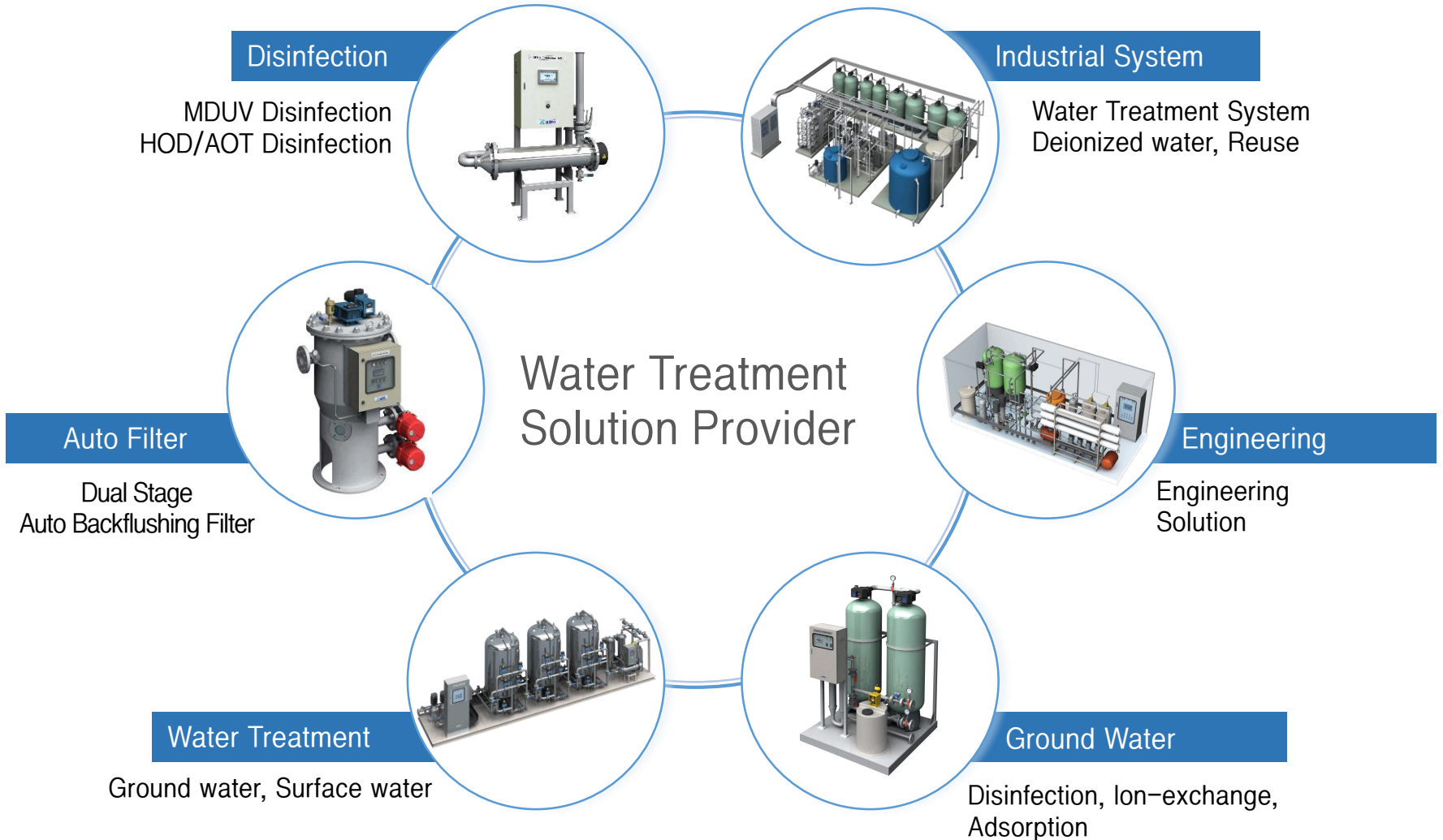


Construction Certi. I



Construction Certi. II

Water Technology Division



Ultraviolet Disinfection Unit

- I. MDUV Disinfection Unit
- II. Waste Water Disinfection Unit

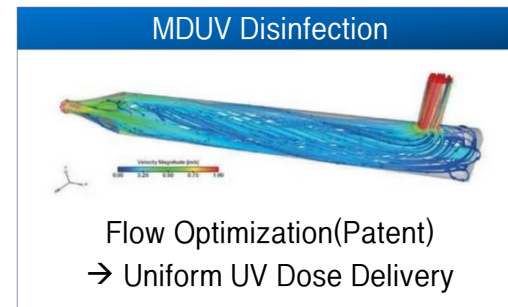
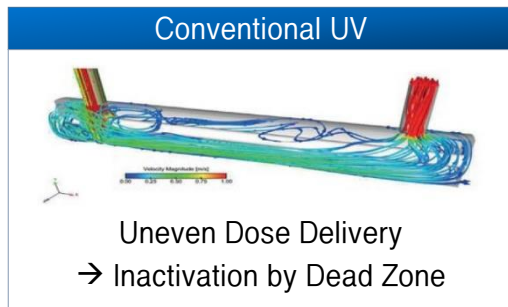
MDUV Disinfection Unit



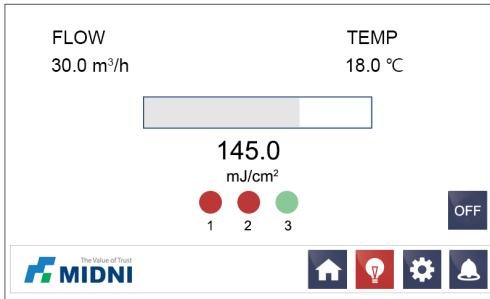
Feature

- MDUV Flow optimization (Patent)
- High Level Disinfection 150 mj/cm² and above
- Amalgam UV Lamp
- Proven performance over Log₃ (99.9%)
- Chemical free disinfection
- Flexible design based on raw quality & flow
- On-line Monitoring & Control

Flow analysis for Optimal Design

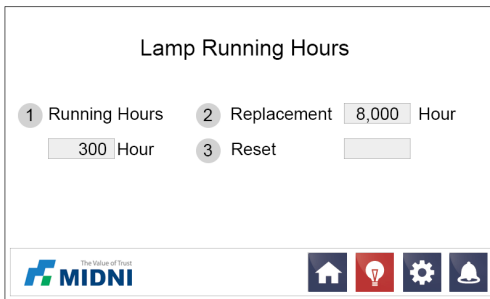


Advanced Monitoring System



Main Screen

- Flow rate
- Temperature
- UV dosage (mj/cm2)
- Lamp on/off
- Lamp status



Running Hours

- Running hours
- Lamp lifetime
- Time reset

Advanced UV Monitoring System

- Conventional UV Monitor mw/cm² → UV Lamp Intensity
- Actual UV dosage “mw/cm² = mw.sec/cm²”
- “mj/cm²” means UV Dosage (Not UV intensity)
- UV intensity & UV transmittance
- Flow rate (Holding time)

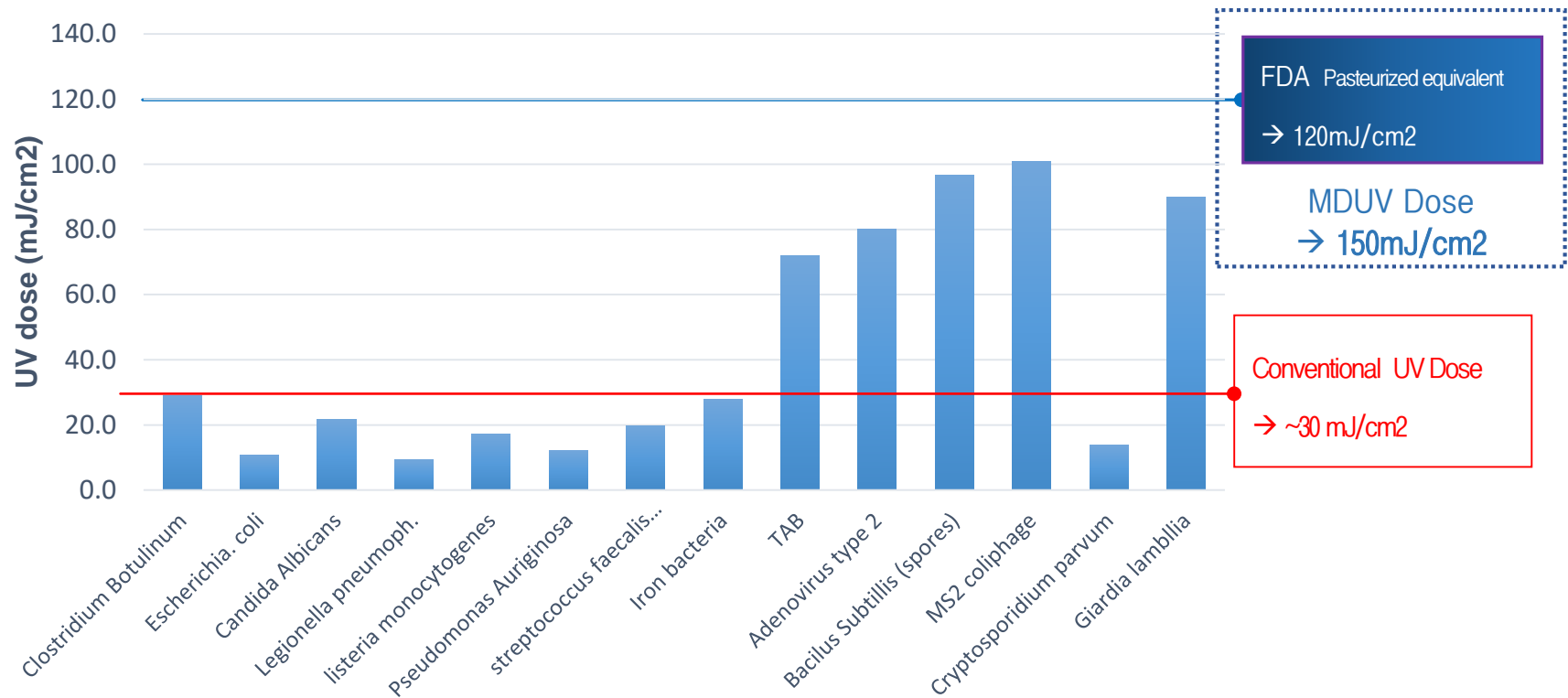


Conventional UV Monitor
Shows only
UV Lamp Intensity

Higher dose means greater DNA damage and more microorganisms are killed
Different microorganisms require different doses to achieve same kills
(e.g. bacteria vs. viruses)

Designing for the right DOSE

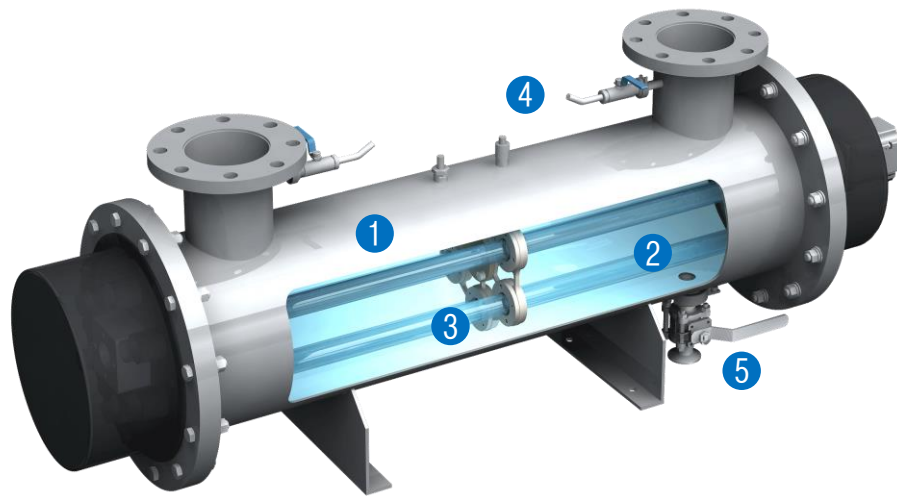
Required UV Dose for 5log Reduction



Different microorganisms such as bacteria and norovirus can be inactivated by MDUV
(5 times UV Dose compared to conventional UV)

Closed Chamber Type Disinfection

Waste water disinfection system that can control the total coliforms, which is the water quality standard for effluent water to fundamentally block the inflow of microorganisms from the water source and reduce the ecological toxicity caused by chlorine in the effluent water. It can be used for a variety of scales ranging from small-sized wastewater facilities to large sewage treatment plants.



- 1 UV Chamber
- 2 Amalgam Lamp / Quartz Sleeve
- 3 Auto Cleaning System
- 4 Sampling Valve
- 5 Drain Valve
- 6 Chemical Cleaning System(option)

Open Channel Type Disinfection



Features

- Flexible modular design
- Most efficient amalgam lamp-based system
- Auto cleaning system
- On-line monitoring system
- Cost-effective maintenance, User-friendly design
- Wastewater, Re-use water application
- Easy expansion to treat higher flows

Wastewater Discharge Quality Standard in South Korea

Capacity		Total Coliforms(/mL)	Ecological toxicity(TU)
500m ³ /day	-	3,000	< 1
500m ³ /day~	District I	1,000	< 1
	District II, III, IV	3,000	< 1

Water Treatment Unit

- I. Integrated Water Treatment System
- II. Arsenic Removal System
- III. Heavy Metal System
- IV. Spring Water Disinfection System
- V. RO System

Drinking Water Quality Standard

- Y2011 Arsenic 0.05mg/L → 0.01mg/L
- Y2019 Uranium 0.03mg/L

Micro-organism	Total colony counts	100CFU/ml	Harmful organic matter	Trichloroethylene	0.01
	Total coliforms	ND/100ml		Dichloromethane	0.02
	Fecal coliforms	ND/100ml		Benzene	0.01
	Escherichia coli	ND/100ml		Toluene	0.7
	Yersinia enterocolitica	ND/2000ml		Ethylbenzene	0.3
Harmful inorganic matter	Lead	0.01		Xylenes	0.5
	Fluoride	1.5		1,1-Dichloroethylene	0.03
	Arsenic	0.01		Carbon tetrachloride	0.002
	Selenium	0.01		1,2-Dibromo-3-chloropropane	0.003
	Mercury	0.001		1,4-Dioxane	0.05
	Cyanide	0.01		Esthetic effect matter	Hardness
	Chromium	0.05	Consumption of KMnO ₄		10
	Ammonia-N	0.5	Odor		ND
	Nitrate-N	10	Copper		1
	Boron	0.005	Color		5
	Uranium	0.03	Alkyl benzene sulfonate		0.5
Cadmium	1.0	pH value	5.8~8.5		
Harmful organic matter	Phenol	0.005	Zinc		3
	Diazinon	0.02	Chloride		250
	Parathion	0.06	Iron		0.3
	Fenitrothion	0.04	Manganese		0.3
	Carbaryl	0.07	Turbidity	1	
	1,1,1-Trichloroethane	0.03	Sulfate	250	
	Tetrachloroethylene	0.02	Aluminum	0.2	

Selection of the Water Treatment System

Parameter	Effects
Microorganism	Pathogen
E. Coli	Pathogen
Arsenic	Skin and lung cancer liver and kidney damage
Fluoride, Uranium	bone damage, Increased risk of cancer, kidney toxicity
Iron, Manganese	potential neurotoxic effects on children,
Nitrate	Methemoglobinemia in infants (blue-baby syndrome)
Hardness, Turbidity	taste and scale deposition
Sulfate	cause diarrhea
Aluminum	Cause skin diseases

Ultraviolet
Disinfection



Arsenic
Removal



Heavy Metal
Removal



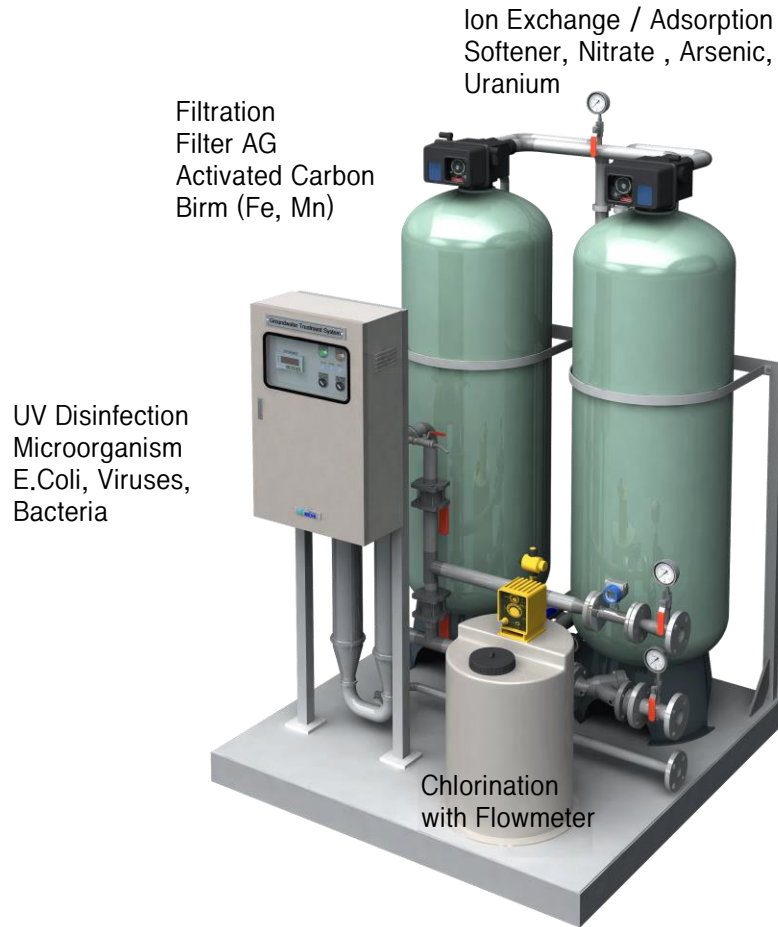
Groundwater
Treatment



RO
System



Integrated Water Treatment System



Features

- One system Multi solution
- Alternative solution based on raw water quality
- Removal Arsenic, Uranium, Nitrate, Selenium
- Patented UV Disinfection unit for microorganism and norovirus inactivation
- Fully integrated, Plug & Play
- Easy & Simple operation
- User friendly control system

MD GW-050
Product No : 23056883

Arsenic Removal System



MDAR 50M

Product No : 22424870/22424871

Features

- Arsenic removal (up to 99%)
- No chemical or regeneration
- Small foot print, long life time of media
- Easy disposal of spent media
- Low capital costs, low operation cost
- NSF 61 product listing
- Less than 0.1% water loss
- Design flexibility and customized solution
- FRP PE or Stainless steel vessel

Arsenic Removal Technologies

Technology	Process	Chemical	Waste	Water Loss
Adsorption	Simple	None	Low	<0.1%
Reverse Osmosis	Complex	Cleaning	Low	25~60%
Ion Exchange	Moderate	Regeneration	High	5~10%
Activated Alumina	Moderate	Regeneration	High	5~10%
Coagulations	Complex	Cleaning	Moderate	<1%

Heavy Metal Removal System

Features

- Removal Uranium, Fluoride, Turbidity, Hardness, Nitrate etc.
- Auto control backwashing & regeneration system
- Easy & Simple operation
- Dual Filtering System by 2nd micro filter
- Less power consumption, cost effective maintenance system



MD IX 030 / MD IX 050

Product No. 23441342 / 23441343

Spring Water Disinfection System

Features

- Inactivation of Microorganism, E-coli, Virus
- Chemical free water treatment
- No disinfection byproducts and no chemical residual



- 1 UV Disinfection Unit
- 2 Control Panel

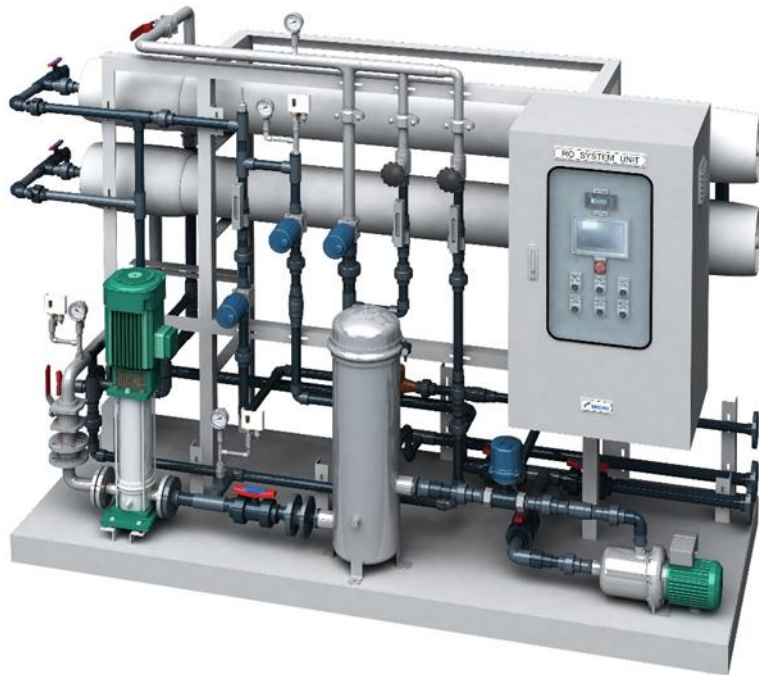
MD TW20
Product No : 22424867



Commercial RO System

Features

- Raw water feed pump
- Micro Filter
- RO high press. Pump
- RO vessel & membrane
- PH, Conductivity meter
- Flow indicators
- Flushing, Solenoid valves
- PLC control panel



MDRO BW050
Product No : 22662376

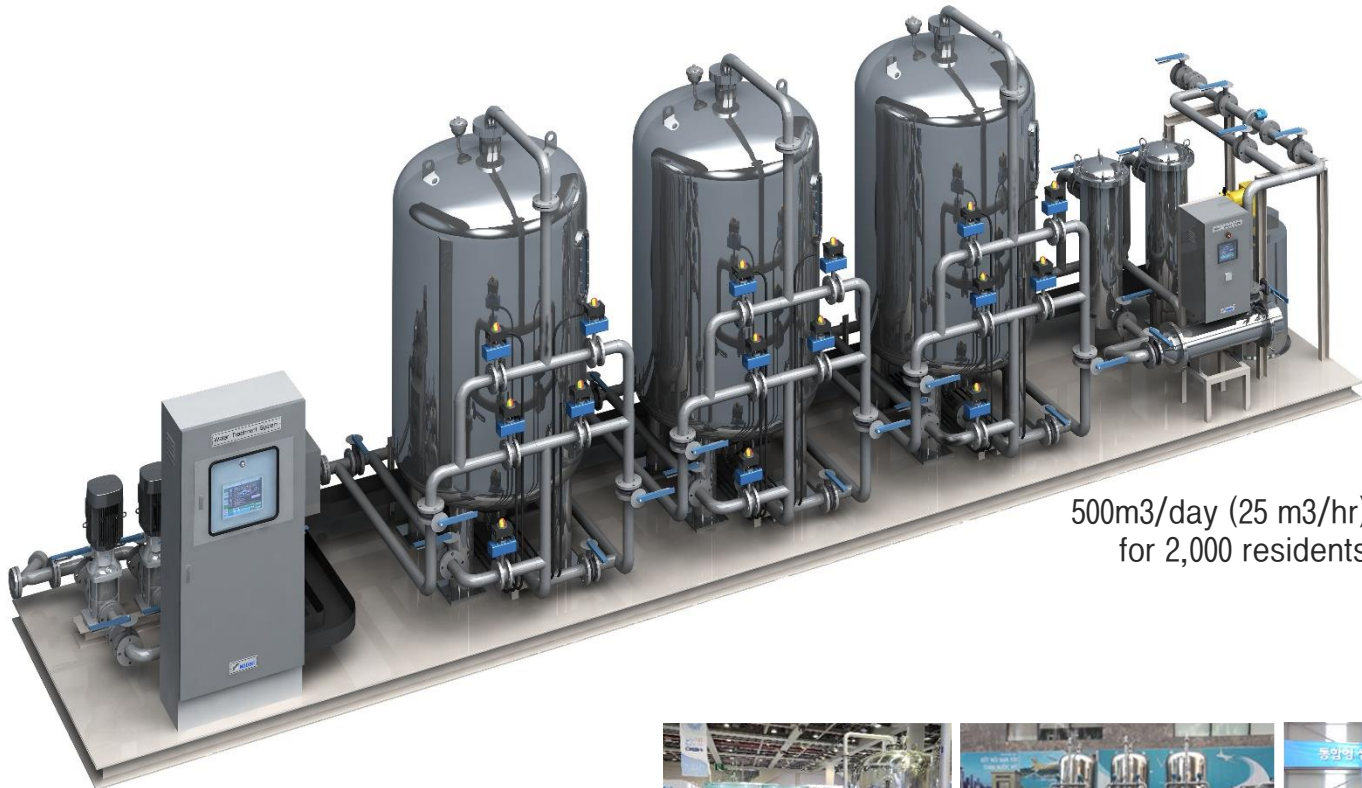


MDRO BW020

Water Treatment System (Tailor Made Solution)

- One System Multi Solution + Remote Water Quality Monitoring System
- 5 STEP FILTRATION + 2 STEP DISINFECTION

Auto Filter → Multi Media, Activated Carbon, Heavy Metal → Micro Filter, UV Disinfection, Chlorination



500m³/day (25 m³/hr)
for 2,000 residents

L) 2018 Korea International Water Week

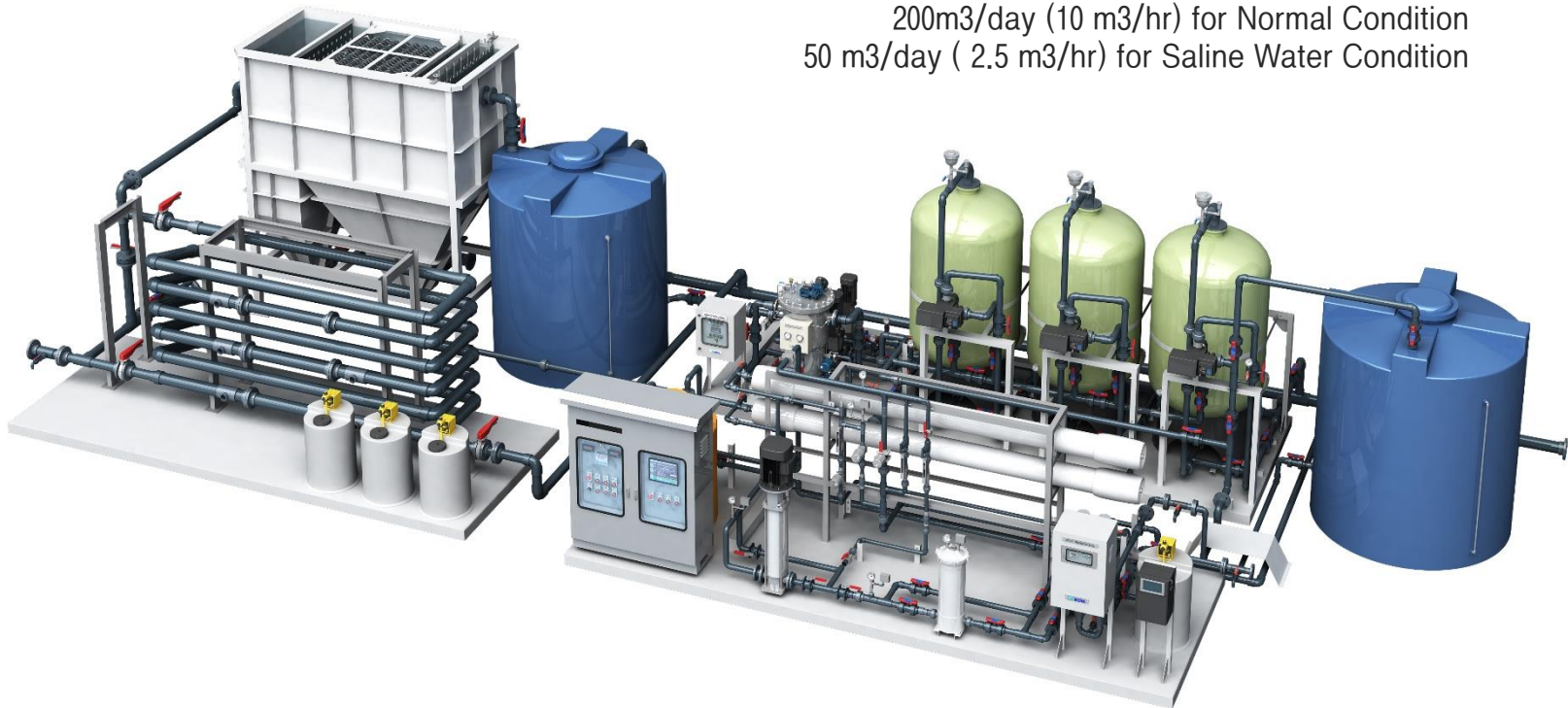
M) 400m³/d System Donation to Vietnam (2017.11)

R) 500m³/d System Commissioning (2018.09)



Water Treatment System (Variable Operation : Normal, High Turbidity, Saline Water)

200m³/day (10 m³/hr) for Normal Condition
50 m³/day (2.5 m³/hr) for Saline Water Condition

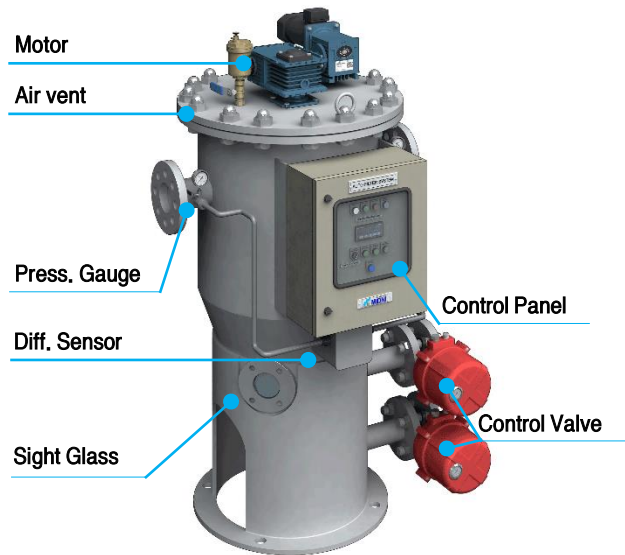


- Normal : Auto Filter – Multi Media – Activated Carbon – Heavy Metal – UV – Chlorination
- High Turbidity : Pipe Flocculation – Sedimentation → Normal Operation
- Saline Water : High Turbidity → Normal Operation → SWRO Operation

Industrial Water Treatment

- I. Dual Stage Auto Back Flushing Filter
- II. Industrial RO System
- III. Packaged Solution
- IV. Industrial Water Treatment System
- V. Water Reuse System
- VI. Ion Exchanger & Filtration

Dual Stage Auto Backflushing Filter / Industrial Water Treatment



Features

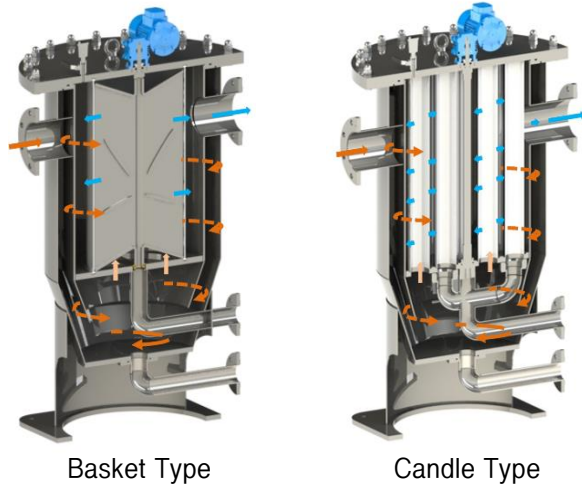
- Dual stage filter by Centrifugal Separation & micro filtration (Patent)
- Auto backflushing by inlet/outlet differential pressure
- Over 95% Separation of solid particles(>50 μ m)
- Optimization by flow analysis
- Durable filter element
- Visually inspect the inside sediment of the filter

Technical Specification

	Description
Flow rate	10m ³ /h ~500m ³ /h (>500m ³ /h, on request)
Design temperature	4°C ~ 75°C
Design pressure	6 bar
Filtration Level	50 μ m, 100 μ m
Filter Element	SUS316L -Wedge wire screen
Filter Housing	SUS304
Electric equipment	Worm Geared Motor (220V, 1P), Control Valve
Different Pressure	0.2 bar (0.5 bar offset)

Dual Stage Auto Backflushing Filter / Industrial Water Treatment

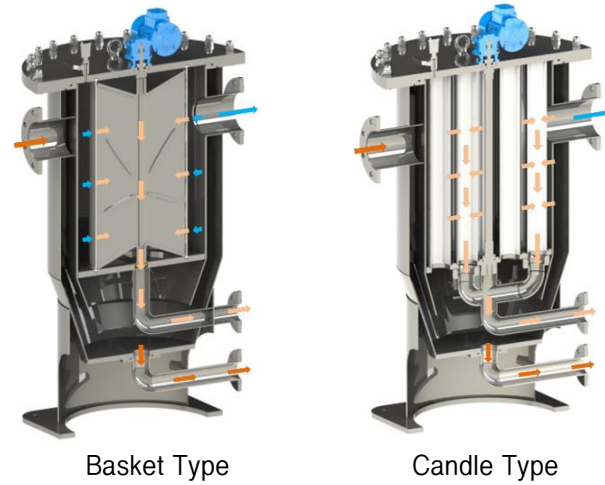
Filtration



Basket Type

Candle Type

Backwashing

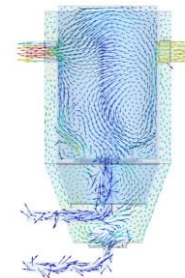
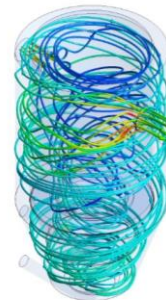


Basket Type

Candle Type

1. The feed particles via inlet are separated by centrifugation and small particles is filtered by screen.
2. As the level of contamination increases, the differential pressure increases and backflushing starts automatically by sensing.

Patent Flow analysis for Optimization

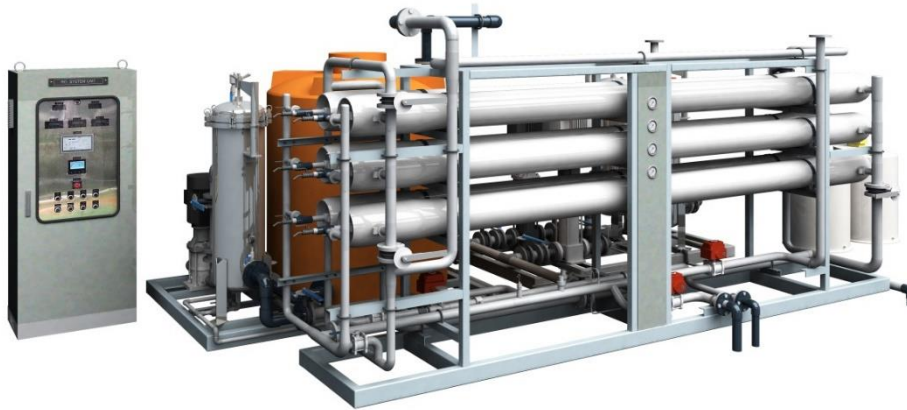


(Patent)

Industrial RO System / Industrial Water Treatment

Features

- Chemical Dosing System
- Micro Filter
- RO High Pressure Pump
- RO Module
- CIP System
- Treated Water Supply System
- Full Automation & Control System
- PLC Touch & Monitoring



BWRO, SWRO

Tailor Made Solution

Design Flexibility

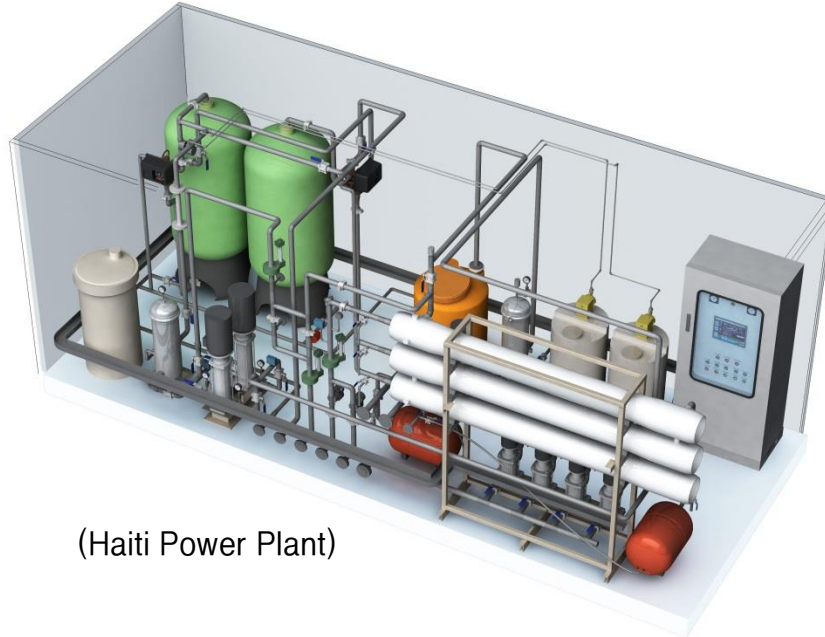
PLC Control & Touch Screen

User Friendly Operation

Easy Maintenance



Packaged Solution / Industrial Water Treatment



(Haiti Power Plant)

Container RO System

20FT(40FT) Container

Raw Water Feed Pump

Depth Filter / Ion Exchanger

Micro Filter

RO System

Chemical Dosing & CIP System

Treated Water Supply System

Full Automation & Control System

RO System Design & Manufacturing

BWRO, SWRO

Tailor Made Solution

Design Flexibility

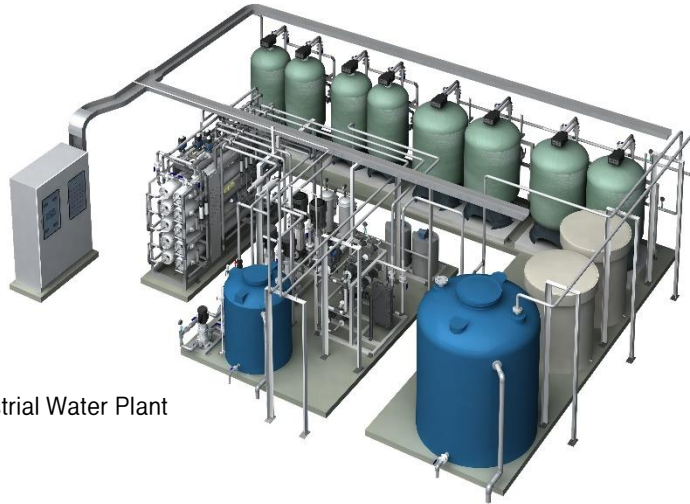
PLC Control & Touch Screen

User Friendly Operation

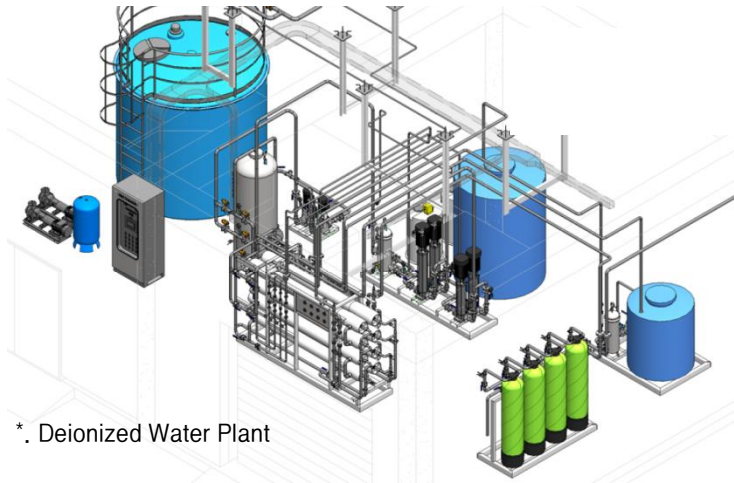
Easy Maintenance



Industrial Water Treatment System

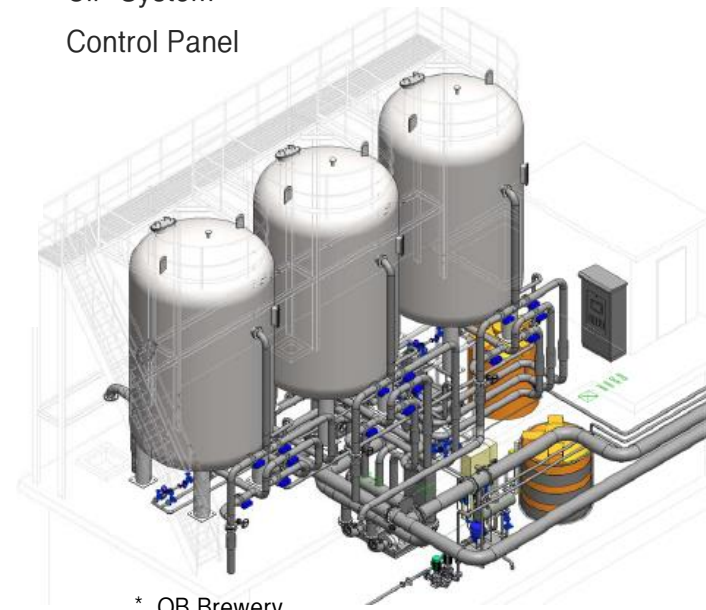


*. Industrial Water Plant



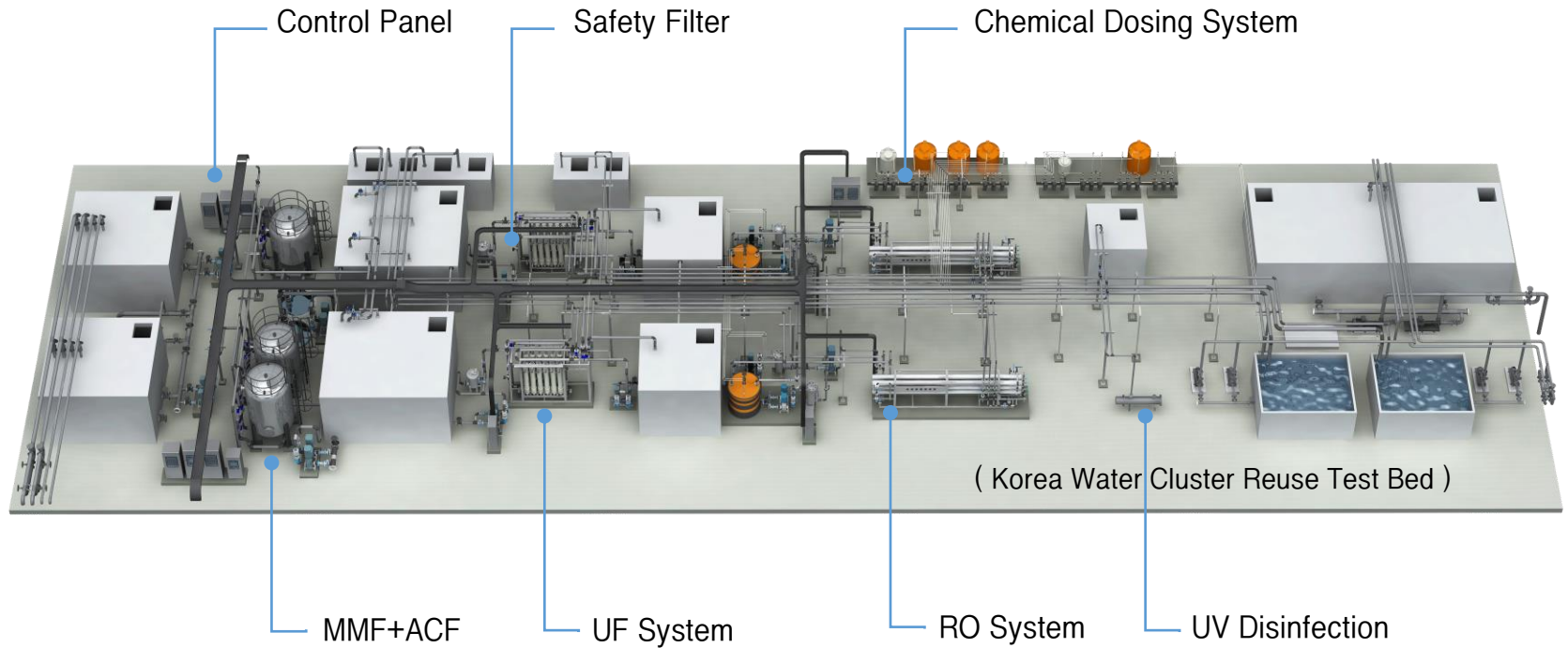
*. Deionized Water Plant

- Water Treatment Solution
- Raw Water Pump
- Micro Filter
- RO High Pressure Pump
- RO Unit
- Chemical Dosing System
- Mixed Bed Polisher
- CIP System
- Control Panel



*. OB Brewery

Water Reuse System



Ion Exchange & Filtration

Application	Media	Feature	Design Criteria
Arsenic Removal	 Absorption Media	NSF 61 No Chemical or Regeneration	EBCT >3.0 Min Freeboard >40%
Water Softener	 Strong Cation Exchange Resin	Auto Regeneration Customized Solution	Tap water <100 ppm Ground W. <200 ppm 50g/l, NaCl 100g/l
Nitrate Nitrogen Removal	 NO ₃ -N Selective Resin	Auto Regeneration Customized Solution	20 ppm every 4 th day 40 ppm every 2 nd day 20g/l, NaCl 200g/l
Fe/Mn Removal	 Birm	Selective for Fe/Mn No Aeration	EBCT >3.0 Min SV >20 l/hr
Activate Carbon	 Activated Carbon	Color, Odor, Taste	EBCT >3.0 Min SV >20 l/hr
Multi Media Filtration	 Filter AG Anthracite	Long lifetime Turbidity Control	EBCT >3.0 Min SV >20 l/hr
Micro Filter	 Cartridge/ Filter Bag	20", 30" 0.2 ~ 50 um	

References



OB Brewery ACF System



Haitai Beverage water treatment



Re-use System



ES Sejong RO System



Krones Softener System



GM Uzbekistan WTS



Malaysia Demi water treatment



Emkor Softener system



Haitai Beverage RO system



OB Brewery ACF System



Haiti packaged solution



Pakistan WTS

References



OB Brewery RO System



Haitai Beverage RO System



Coca-Cola UF System



Nike RO System



LG Health care RO System



Yeonsei-Dairy HOD



OB Brewery Disinfection



OB Brewery Softener



OKF HOD



Haitai Beverage MDUV



Seaweed Disinfection System



Binggrae MDUV

References



Yeonwolgun arsenic removal



Arsenic removal System



Chuncheon arsenic removal



Gapyeong arsenic removal



Samcheok-si arsenic removal



Gwacheon arsenic removal



Yangpyeong uranium removal



Yeonwolgun fluoride removal



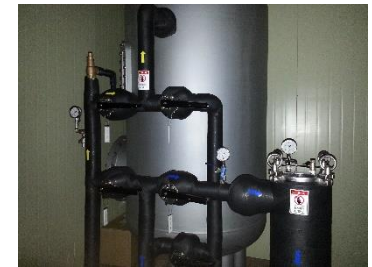
Hawcheon arsenic removal



Gosung manganese removal



Gawngju uranium removal



Yangpyeong iron removal

A Member of KWCC (Korea Water Cluster Conference)





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