一般財団法人
造水促進センター
WATER REUSE PROMOTION CENTER
WRPC

Proposals for Water Environment Improvement in Mongolia

Aug.18. 2023

Tatsumi SHIMONO
Water Reuse Promotion Center, Japan

Outline of WRPC

President, WRPC
Kazuo Yamamoto
Emeritus Professor, the University of Tokyo

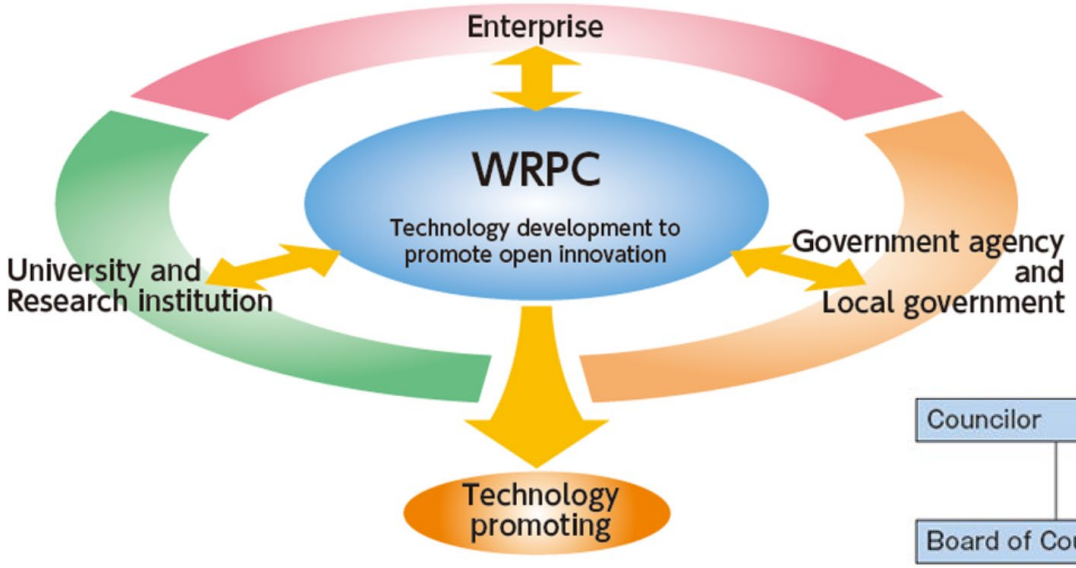
■**Our Service**
(1) Research and Development of Water Treatment Technologies
(2) Survey on Water Treatment Technologies
(3) Dissemination of Water Treatment Technologies
(4) Training on Water Treatment Technologies
(5) Exchange/Cooperation with relevant organizations in Japan and abroad
(6) In addition to the above, businesses necessary to achieve the purpose of this Foundation.

■**Establishment** May 10, 1973

■**Transformation** March 1, 2010 (change to a General Incorporated Foundation)

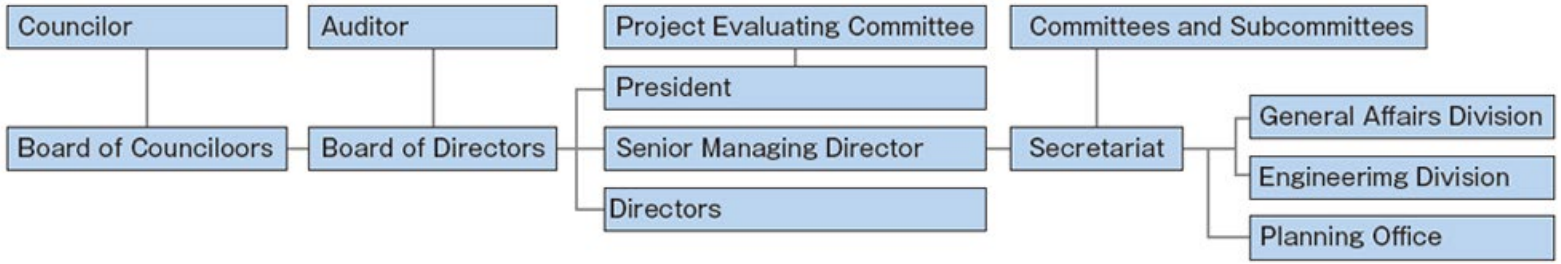
■**Fundamental Property** 350 million Yen (as of Mar 31, 2019)

■Position of WRPC



■Number of Certified Person
9 Doctors of Engineering
9 Professional Engineers
6 Pollution Control Managers
12 Other Certified Person

■Organization



Environmental Background

✓Due to rapid industrial development in Mongolia, it is necessary to deal with environmental pollution and secure water.

✓Leather tanning factories, mines, wastewater treatment in ger districts and water reuse in residential areas emerge as targets.

✓In particular, wastewater from leather tanning factories has a high environmental impact, and improvements in this area are effective in reducing the environmental impact.

✓Japan’ s Water reuse promotion center is cooperated with in Ulaanbaatar with MOU to solve water environmental problems.

Our policy ⇒ By using Japan’s technology to contribute for the improvement of the environment in Mongolia

From JICA web site
https://www.jica.go.jp/oda/project/1400610/index.html

Future Environment・・・

It is the turning point for the future environment

From Hatena Blog

From AFP ●BB News

If doing action for environment・・・・

Action for Environmental protection

- Safe, secure, and rich natural environment
- Industrial development
- formation ofa high quality civilized society

✓ Industrial Development
✓ Population Growth
✓ Improvement of lifestyle

Still no countermeasures・・・・・・

From 2022 gooddo magazine

Increase in waste and wastewater

⇒ deterioration of water environment

Polluted Environment

- Sacrifice of living environment
  Pursue Productivity
- Deterioration of sanitary environment
  ⇒ disease epidemic

From AFP ●BB News

From Wearth

From AFP ●BB News
https://www.afpbb.com/articles/-/3294550?pid=3294550002
https://www.afpbb.com/articles/-/2807030?pid=7351350

From Hatena Blog
https://muto.photowork.jp/entry/Mongolia_nov

From 2022 gooddo magazine
https://gooddo.jp/magazine/oceans/marine_pollution/

From Wearth
https://wearth.tokyo/red-tide/

Water environment issues in Mongolia

✓ Expected markets for solving water environmental issues

Target of improvement for water environment

- Leather Tannery wastewater treatment
- Car wash wastewater recycling, water saving
- Domestic wastewater treatment in the Ger district
- Mine wastewater treatment and water recycling
- Food factory water supply treatment and wastewater treatment

Expected Results

- Water environmental protection in Mongolia
- Reducing impact for central sewage treatment plant
- Effective water saving for car wash water by using recycle technology
- Comfortable living life by using compact sewage treatment system
- Effective water reuse at mining process
- Good food products quality by using water treatment technology for process water at food processing plant

Our activities for solving environmental problem

Leather Tannery wastewater treatment

SUMINAX

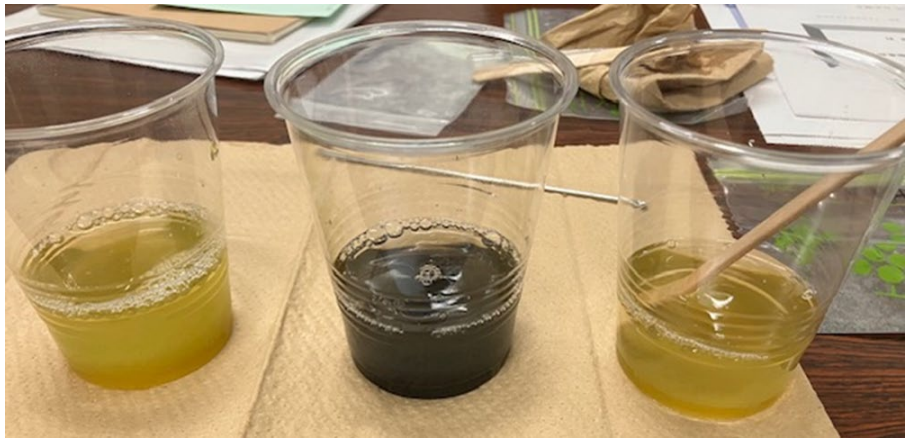
SUMINAX is the composed of over 10 kinds of inorganic(mineral)complex compound(such as Na2SO4, MgCl2,Ca(OH)2)to gain large positive electric charge.

1)Safe to use even I drinking water purification plant
2)Quick response for flocculation
3)Easy to dehydrate sludge
4)Effective for soluble metal ion

Removing function

MATERIAL	Raw Water (mg/L)	Amount (ppm)	Supernatant (mg/L)	Removal Rate (%)
Arsenic	1.14	250	0.012	96.5
Fluorine	5.94	250	0.1	98.3
Iron	302	670	<0.03	99.9
Manganese	36	30	2	94.4
Calcium	250	55	160	85.6
Phosphorus	15	55	0	100
Cooper	6.4	670	0.07	98.9
N-hexane	42	670	0.7	98.3

Leather Tannery wastewater treatment

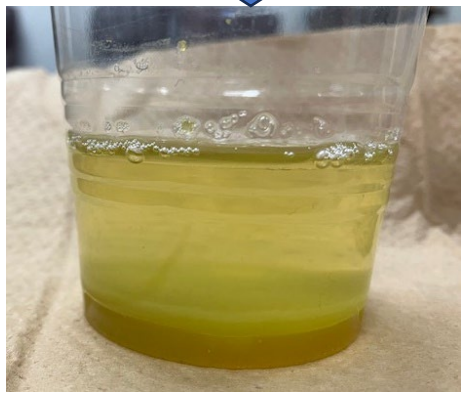


Raw waste water+Suminax(Model liquid)
Start up

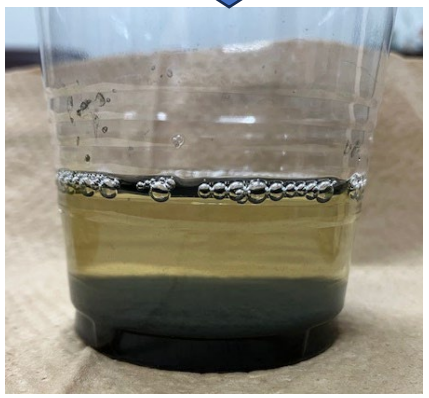
Suminax A

Suminax B

After 10min



SuminaxA+Chemicals



SuminaxB+Chemicals

After 30min

Expectations: Reducing Cr concentration and BOD value from leather tannery waste water
Reducing impact for discharging of waste to Central sewage treatment plant

Car wash wastewater recycling & water saving

Pay with
treatment volume

Mobile treatment system

On site treatment

Recycling plant

Wastewater collecting & recycled water supplying pipe line

Expectations: Water saving for car washing process & saving money
Protection for the source of ground water

Domestic wastewater treatment in the Ger district

Ideal plan of waste water treatment for ger dwelling in Mongolia

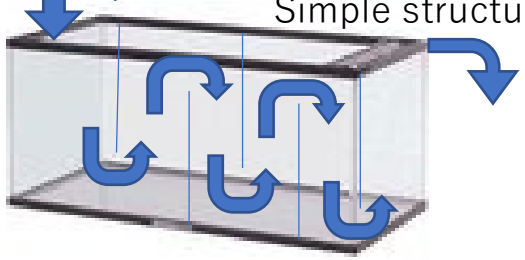
From achikochi.takema.net

http://achikochi.takema.net/kaigai2/mon05/05mon_19elstai3.htm

Treatment material from Mongolia

Sewage

Simple structure



Sewage treatment pit

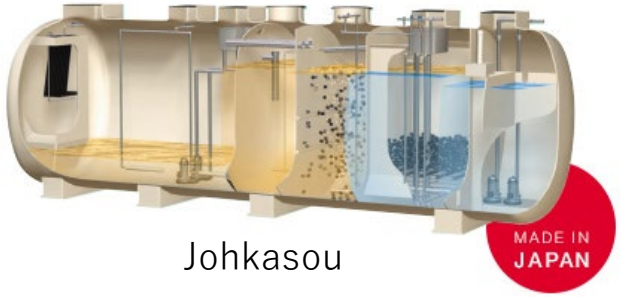
Suitable for Mongolian style

Example of waste water treatment at camping area in Japan

From Soranoshita.net

https://www.soranoshita.net/blog/post-9827/

Sewage



Johkasou

Johkasou

Japanese compact sewage treatment system named “Johkasou”

From Kubota Web site

https://www.kubota.com/products/johkasou/

Expectations: Comfortable living life by treating sewage

Protection for the source of ground water

Water and wastewater treatment at food processing plant

※ Aging treatment system and Deterioration of energy efficiency

Expecting installation of Japanese technologies with energy saving

Process water treatment system made in China

Process water treatment system with RO membrane

Expectations: Long life and stable operations with using Japanese technology
Energy saving by using advanced technology

Mining wastewater treatment and water recycling

River water & Under ground water

Water saving

Photo by ：bazarsadbayarsaikhan / Pixabay [Pixabay License])

Ideal plan of water reusing

Retrofit

Sewage for reusing

Central sewage treatment plant

Minimize wastewater

Waste water

Environmental pollution

Advanced process

Conventional process

Expectations: Reducing feed water for mining. Water saving by using treated reusing water
Increased production by keeping process water

Conclusion

✓We would like to support for environmental protection of Mongolia.

✓Especially, we are expecting for using Japanese technology for solving water environmental issue.

✓Solution for those items, we are already did proposal and stand by stage of pilot test.

✓In additionally, we would like to provide various Japanese technology to suitable fields such as wastewater recycling.

✓If you interest those, please contact us.

WATER REUSE PROMOTION CENTER
Tatsumi SHIMONO
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Company Introduction

August 18, 2023

Kyowakiden Industry Co., Ltd.
Masatoshi NAKANOSE

協和機電工業株式会社
Kyowakiden Industry Co.,Ltd.




About KYOWAKIDEN

Our goal is to realize sustainable people's lives and water environment through our business related to public infrastructure and plant facilities such as Water purification, Sewage & Wastewater treatment, and Energy & Electricity facilities.

Company Name	：Kyowakiden Industry Co., Ltd.
Head office	：Nagasaki City, JAPAN
Establishment	：1948
Employees	：540 (Group total 800)

Water

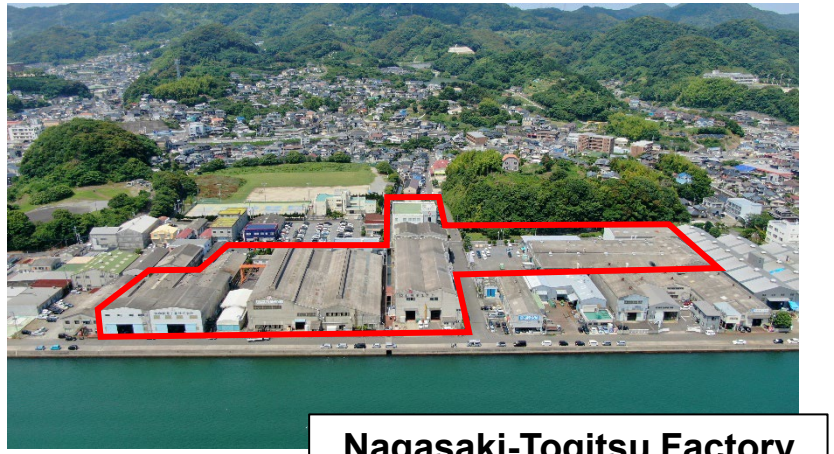
Water purification, Desalination,
Sewage treatment, Waste water treatment,
Water recycle

Energy Electricity

Control & Monitoring system,
Energy saving, μ-Grid,
Information Technology,

O & M
Operation Maintenance

Equipment diagnosis & replacement
(Motors, Pumps, etc.)
Facility operation service,



Nagasaki-Togitsu Factory

Nagasaki-Mie Factory

Branch：Tokyo, Osaka, Fukuoka,
Hiroshima, Okinawa, etc
Group company：7 in JAPAN, CHINA, VIETNAM

CASE STUDY

Case study 1 - Reduction of Water Usage for Car Wash -

Current situation

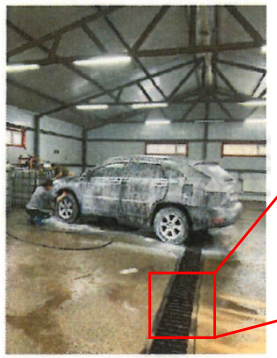
As long as it can be used for pre-cleaning, high water quality is not required.

Wastewater Recycling Facility ?

The supernatant water, which has settled overnight in the discharge tank, is being reused.

Recycled water (Pre-wash)

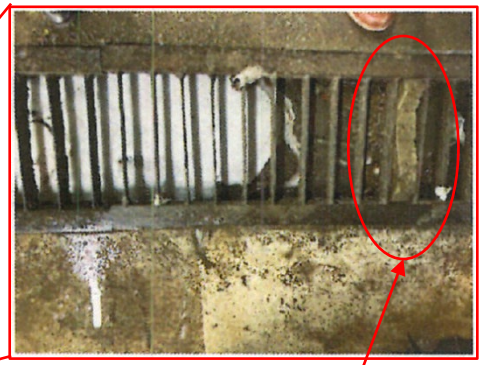
Car Wash



Detergent

Tap water (Rinse wash)

Drainage



Sponge for Oil and Sand Separation

Discharge tank

Sewage Discharge

Estimation of Water Usage for Car Washing

	Water capacity	Charge：1.24USD/m3 (Water0.67+Sewage0.57)
Per Car Wash Facility (50 cars/day)	5m3/day	Water Costs : 2,000USD/year
Total for UB City (1,000 car wash facilities, 15 million cars annually)	5,000m3/day 1,640,000m3/year	Water Costs : 2,000,000USD/year

Maximizing Water Recycle

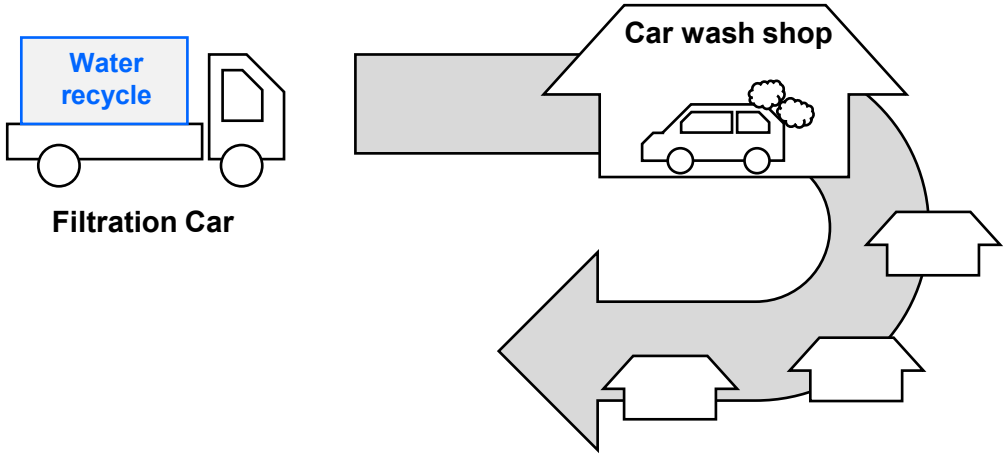
Effective Resource Utilization
Reducing Water Costs

Case study 1 - Reduction of Water Usage for Car Wash -

Large Car Wash Shop

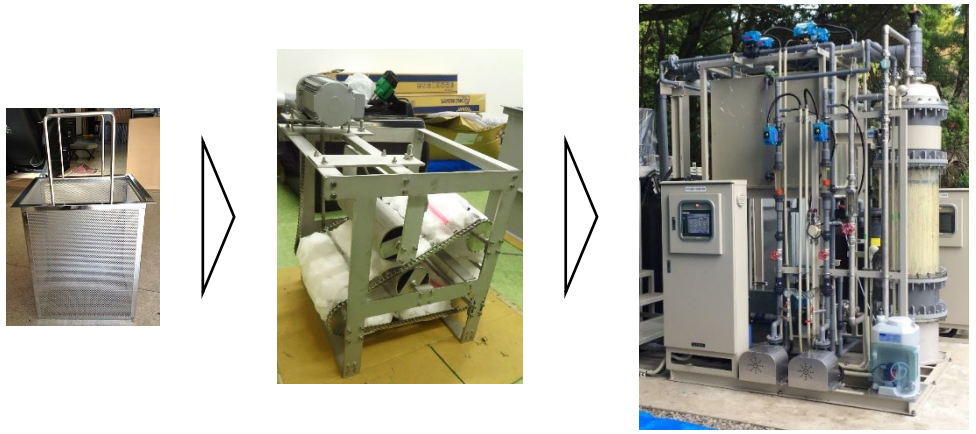
Investment to Wastewater recycling system

Small Car Wash Shop



Filtration Car

Mobile Service for car wash wastewater recycling



Low Water Quality	High Water Quality
Low cost	Expensive

Challenge: Implementation Costs

Government Subsidy Programs applicable?

Case study 2 - Waste water treatment -

Plating wastewater treatment

- Capacity : 240m3/day
- System : Cr6+ reduction, coagulation, submerged membrane filtration
- Location : JAPAN

Waste water

Screen → Primary & Secondary Cr6+ reduction → PH control Coagulant → Clarifier → Submerged membrane filtration → Treated water

Cr6+: 40mg/L
Total Cr: 50mg/L
Ni: 15mg/L

Cr6+: <0.01mg/L
Total Cr: <0.02mg/L
Ni: <0.2mg/L

Clarifier

Submerged membrane filtration

Case study 2 - Waste water treatment -

Food process water treatment

- Capacity : 80m3/day
- System : Microorganism carrier, anaerobic treatment, Dissolved air flotation
- Location : JAPAN

Waste water

Screen → Equalization tank → Anaerobic treatment → Aeration tank with Microorganism carrier → Clarifier → DAF → Treated water

BOD: 4,800mg/L
SS: 2,400mg/L
T-N: 660mg/L

BOD: <20mg/L
SS: <40mg/L
T-N: <60mg/L

Microorganism carrier

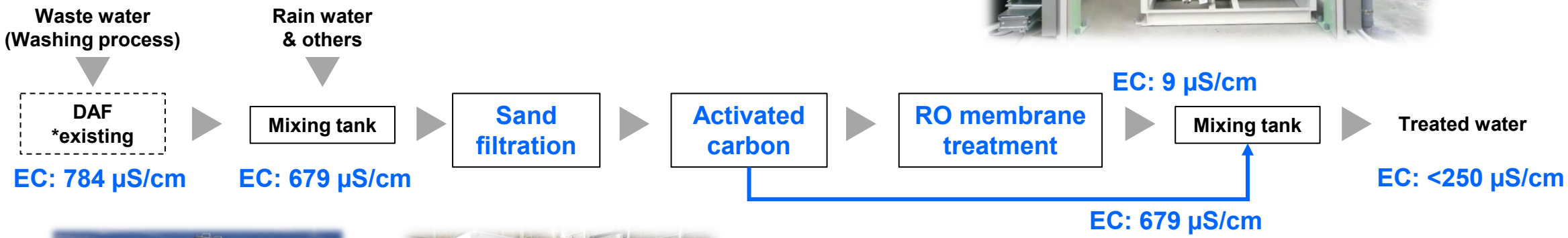
Clarifier

DAF

Waste water recycle

Waste water recycle system *upgrade project

- Capacity : 300m3/day
- System : DAF, Sand filtration, Activated carbon, RO membrane
- Location : JAPAN



Sand filter & Activated carbon

RO membrane unit

The proposal is satisfied customer requirements for water quality and capacity with OPEX/CAPEX reduction by mixing water.
This system is based on our engineering know-how and operation control technology.

Thank you for your attention!!



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