DRINKING AND RO PRODUCT WATER					
Substances	Symbol	WHO Guidelines	Typical Seawater	RO Product Water	2nd RO Product Water
Chloride	Cl^-	250.0	19,300.0mg/ℓ	121.2mg/ℓ	4.7mg/ℓ
Total organic carbon	TOC		6.0mg/ℓ	0.3mg/ℓ	<0.1mg/ℓ
Iron	Fe	0.3	0.1mg/ℓ	TRACE	0
Manganese	Mn	0.1	0.2mg/ℓ	TRACE	0
Sulfate	SO_4	400.0	3,100.0mg/ℓ	13.0mg/ℓ	0.4mg/ℓ
Sodium	Na	200.0	10,837.8mg/ℓ	70.2mg/ℓ	2.7mg/ℓ
Potassium	K	-	400.0mg/ℓ	3.4mg/ℓ	0.2mg/ℓ
Silica	SiO_2	-	2.7mg/ℓ	0.1mg/ℓ	0.03mg/ℓ
Fluoride	F	1.5	0.2mg/ℓ	TRACE	TRACE
Calcium	Ca	300.0 as $CaCO_3$	440.0mg/ℓ	1.8mg/ℓ	<0.1mg/ℓ
Magnesium	Mg		1,310.0mg/ℓ	5.8mg/ℓ	0.2mg/ℓ
Bicarbonate	HCO_3	-	150.0mg/ℓ	1.3mg/ℓ	0.1mg/ℓ
pH	pH	6.5~8.5	8.3	7.1	6.2
Total dissolved solids	TDS	1,000.0	35,541.0mg/ℓ	217.0mg/ℓ	8.0mg/ℓ
Electric conductibity	μs/cm	-	58,600.0μs/cm	405.0μs/cm	15.0μs/cm
Bacteria		100/mℓ	500.0	0	0
Total coliforms		0/100mℓ	Positive	Negative	Negative
Turbidity	NTU	5	4.0	<1.0	0

HEALTH EFFECTS AND WATER TREATMENT PROCESS			
Substances	WHO Guidelines	Health effects of excessive intake	Measures
Total coliform	Absent	Peroral infectious disease, gastrointestinal tract disease.	Boiling, chlorination.
Arsenic	0.05mg/ℓ	Keratoses, Hyperesthesia, Cirrhosis. Affects nervous systems.	Discontinue consumption. Treatment by RO process. New water source.
Hexavaient chromium	0.05mg/ℓ	Severe vomiting, diarrhea, kidney disease.	
Nitrate Nitrite	10.0mg/ℓ	Infantile methemoglobinemia in children under age 6 and respiration disorders.	RO treatment. New water source. Consumption for other use.
Manganese	0.1mg/ℓ	Nervous system disorder - speech impediment, stains laundry and utensils.	Demanganization. New water source.
Chloride	250mg/ℓ	High concentrations give water and beverages undesirable taste.	Brackish water RO prosess for concentration below 900ppm. Seawater RO process for concentration over 900ppm.
Calcium.Magnesium (Hardness)	300mg/ℓ as $CaCO_3$	Excessive intake can cause gastrointestinal disorders. Hard water scale deposits on pipe, increase soap consumption which is a nuisance and an economical burden. Not suitable for boiler water. Water of 10-100ppm hardness is palatable.	RO process.
pH	6.5~8.5	Direct relationship between human health and pH in drinking water is unknown. A measure of the acidity or alkalinity of water.	

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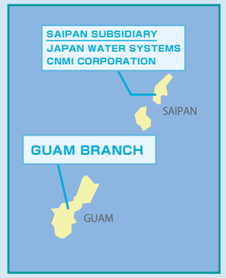
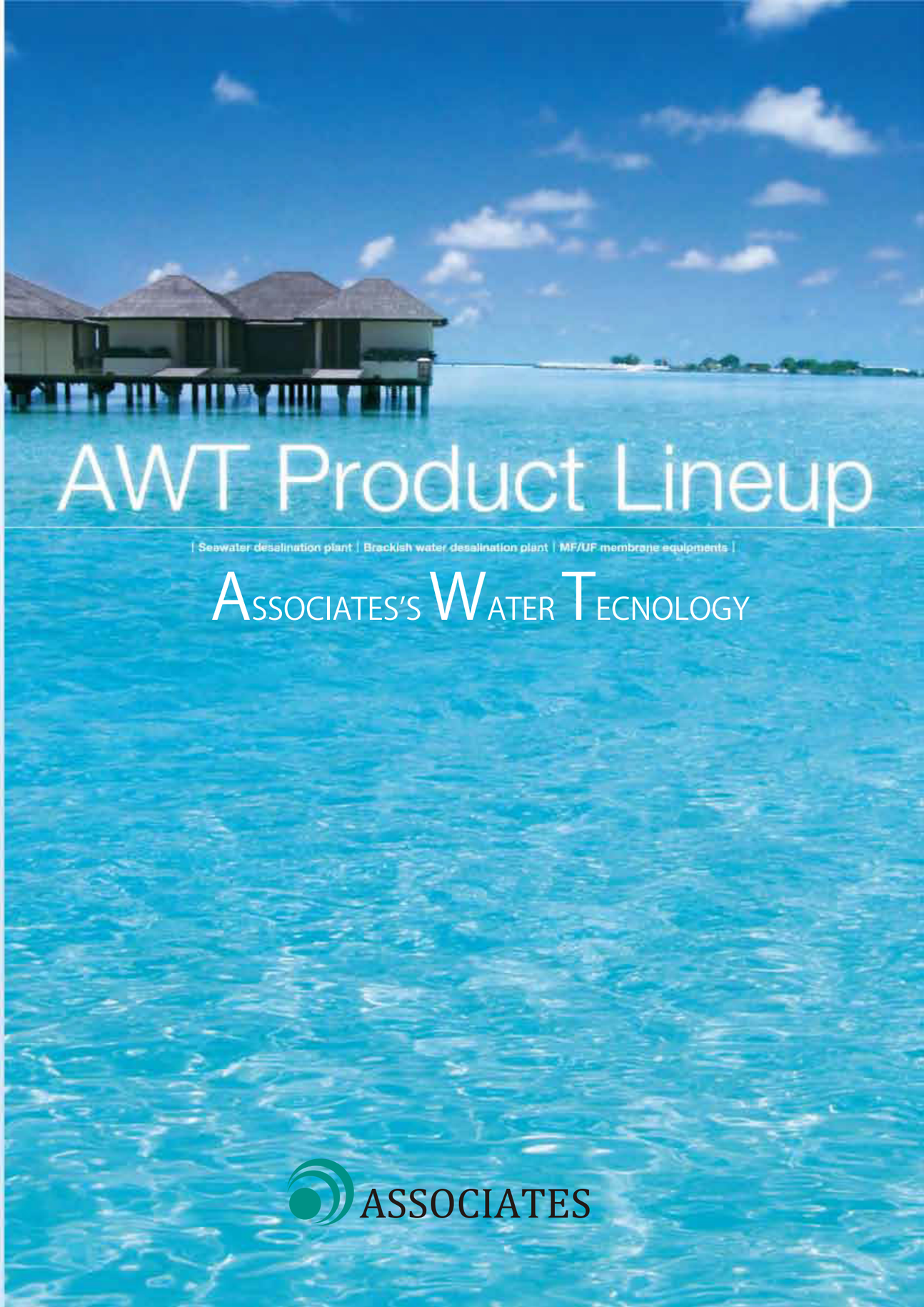




ASSOCIATES'S WATER TECNOLOGY

Next standard for the earth

Building a Better Tomorrow for Water and People

Our watery plant, Earth, provides a rich reservoir of seawater and groundwater.
However, only around 1% of this water can be used as drinking water.
At this very moment, a variety of changes in the natural environment, including natural disasters such as typhoons and drought, global warming, and geographical factors, are bringing about serious water shortages throughout the world.
If only we could eliminate regional differences in water supply and readily provide reliable and safe water for future generations.
We aim to use water treatment technology that is friendly towards all peoples and the environments, in order to bring about better global standards for tomorrow.

Easy on the Earth

The reverse osmosis membrane method reduces the burden on the environment

The reverse osmosis membrane method helps bring about environmentally-friendly seawater desalination with outstanding heat efficiency in comparison with the evaporation method, which requires large facilities and heat quantities. This allows water to be produced at small facilities, efficiently.

Easy on people

Easy-to-use simple design

With simple operation and maintenance, our equipment can be used by all. The desalination systems we plan benefit from outstanding usability, including an operational level that can be intuitively understood by people anywhere in the world.

Easy on the future

Operability that seeks to be cost efficient

In comparison with the chemical dosing methods of the past, which require maintenance such as the replacement of measuring equipment and chemicals, our method has achieved simple operation and maintenance management, as well as long-term durability. We are proud of our outstanding cost performance and operability.

Lineup

ASSO-FI-TR

Plants producing massive volumes of freshwater from seawater

ASSO-KQ-TR

Designing concept with superior usability

ASSO-FDI-TR

Plants for producing freshwater directly from seawater

ASWO-80P

A design where toxic substances can be removed up to 99%

ASWO-D

Two systems can be operated separately in a single unit

MF/UF membrane equipments

Seawater desalination plant

Sizes vary from small to large, and shapes and operability are also variable.
All products in the product line-up are created as user-friendly products.

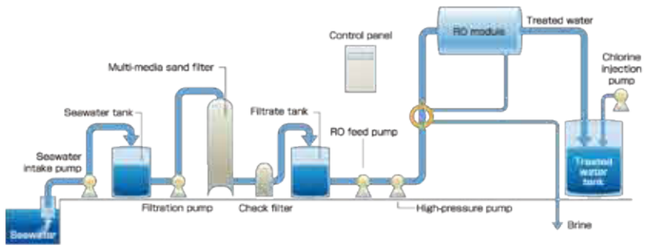
Seawater desalination plant

ASSO-FI-TR Large plant-type series

2,000m³/d Maximum desalination volume per unit | 250m³/d Minimum desalination volume per unit

Plants producing massive volumes of freshwater from seawater

Installation period is short although the plant is large due to having the equipment established in module setup method



Standard-type large plant-type products are as listed below

As a specialist water treatment manufacturer, AWT is capable of providing large standard plants for the production of massive volumes of water as much as 250.0 - 2,000 m³/day.

Our past delivery track record has established our superior reliability

Plants producing 4,000 m³/d or 5,000 m³/d operate in various countries all over the world. Despite being large-type equipment, they are modularized and continuously manufactured in a plant specialized for RO equipment. Since they are created in module-type structure, they can be installed in a short period of time, and are highly praised for their superior standards.

Name of model		FI-250TR	FI-300TR	FI-500TR	FI-750TR	FI-1000TR	FI-1500TR	FI-2000TR
Treated water volume	m³/d	250.0	300.0	500.0	750.0	1,000.0	1,500.0	2,000.0
	m³/h	10.4	12.5	20.8	31.3	41.7	62.5	83.3
	m³/m	0.17	0.21	0.35	0.52	0.69	1.04	1.39
Seawater intake volume	m³/d	714.0	811.0	1,351.4	2,027.0	2,702.7	4,054.1	5,405.4
	m³/h	29.8	33.8	56.3	84.5	112.6	168.9	225.2
	m³/m	0.50	0.56	0.94	1.41	1.88	2.82	3.75
Recovery rate (%)		35.0	37.0	37.0	37.0	37.0	37.0	37.0
Shaft power (kW)		49.8	56.5	94.1	141.2	188.3	282.4	376.5
Motor used (kW)		55.0	75.0	110.0	160.0	200.0	300.0	450.0
Electric consumption (kWh/m³)		4.78	4.52	4.52	4.52	4.52	4.52	4.52
Depth (mm)		1,800	2,000	2,200	2,300	3,500	5,000	6,000
Width (mm)		7,500	7,500	7,500	7,500	7,500	7,500	7,500
Height (mm)		2,000	2,000	2,400	2,400	2,400	2,400	2,400
Energy saved (kW)		24.88	28.24	47.07	70.60	94.13	141.20	188.27

Pick UP

How long is the reverse osmosis membrane lite for?

All reverse osmosis membranes need to be replaced in approx. 5 years. Since reverse osmosis membranes gradually damage, it is best to replace 20% of them each year to maintain water quality rather than replacing all of them at once.

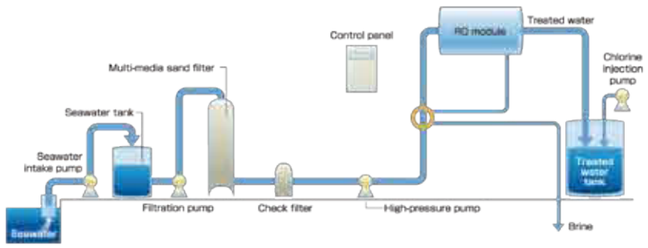
Seawater desalination plant

ASSO-KQ-TR Easy to operate-type series

220m³/d Maximum desalination volume | 65m³/d Minimum desalination volume

Designing concept with superior usability

Energy-saving device incorporated as standard system



Name of model		KQ-65TR	KQ-110TR	KQ-D130TR	KQ-D220TR
Treated water volume	m³/d	65.0	110.0	130.0	220.0
	m³/h	2.71	4.58	5.42	9.17
	ℓ/m	45.1	76.4	90.2	152.8
Seawater intake volume	m³/d	172.8	302.4	345.6	604.8
	m³/h	7.2	12.6	14.4	25.2
	m³/m	0.12	0.21	0.24	0.42
Recovery rate (%)		37.62	36.38	37.62	36.38
Shaft power (kW)		9.98	17.5	19.96	35.0
Motor used (kW)		11.0	22.0	11.0×2	22.0×2
Electric consumption (kWh/m³)		3.68	3.82	3.68	3.82
Depth (mm)		1,800	1,800	1,800	2,000
Width (mm)		5,750	5,750	5,750	5,750
Height (mm)		2,000	2,000	2,000	2,000
Energy saved (kW)		4.99	8.73	9.98	17.46

This series has received continued popularity throughout the world for achieving short delivery times

This model provides short delivery times at low cost because its design assumes operation in a wide range of locations throughout the world, meaning it can be used in line with customers' wishes with a minimum level of customization.

Outstanding operability and usable by all

Users are not required to possess any special technique, and the units can acquire germ-free drinking water only a minute after turning on the power.

Using select valve

Users can select water according to their own needs by switching to Quality mode when water quality is important, and to Volume mode when a large volume of water is required.

select valve

Seawater desalination plant

Sizes vary from small to large, and shapes and operability are also variable.
All products in the product line-up are created as user-friendly products.

Seawater desalination plant

ASSO-FDI-TR All-in-one-type series

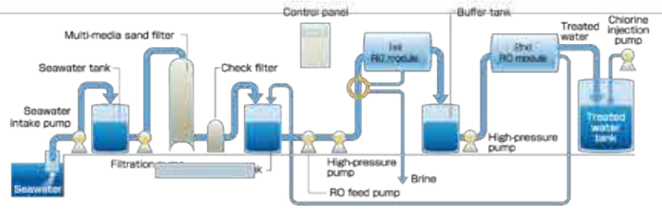
Plants for producing freshwater directly from seawater

Using 2-pass RO system!

2,000m³/d	50m³/d
Maximum desalination volume	Minimum desalination volume

Highly flexibility enabled for producing water of the preferred quality

Users can acquire water of the preferred quality within the range of TDS 10.0 ppm to 500.0 ppm of treated water. The highly flexible features of the plant will ensure water of optimum quality for your own purpose.



Superior products created by high-technology

By using 2-pass RO system which has been created by fully utilizing high-technology, the water produced is of equivalent quality with that produced by the evaporation method. The RO-method has lower costs when considering facilities costs and running costs.

Name of model		FDI-50TR	FDI-100TR	FDI-200TR	FDI-300TR	FDI-500TR	FDI-750TR	FDI-1000TR	FDI-1500TR	FDI-2000TR
Treated water volume	m³/d	50.0	100.0	200.0	300.0	500.0	750.0	1,000.0	1,500.0	2,000.0
	m³/h	2.1	4.2	8.3	12.5	20.8	31.3	41.7	62.5	83.3
	m³/m	0.03	0.07	0.14	0.21	0.35	0.52	0.69	1.04	1.39
Seawater intake volume	m³/d	167.8	292.4	540.5	721.0	1,301.4	1,962.1	2,602.7	3,904.1	5,205.1
	m³/h	7.0	12.2	22.5	30.0	54.2	81.3	108.4	162.7	216.9
	m³/m	0.12	0.20	0.38	0.50	0.90	1.36	1.81	2.71	3.61
Recovery rate (%)		29.8	34.2	37.0	38.4	38.4	38.4	38.4	38.4	38.4
Shaft power (kW)		10.1	17.7	32.6	47.2	78.6	117.9	157.2	235.8	314.4
Motor used (kW)		11.0	22.0	45.0	75.0	110.0	160.0	200.0	260.0	330.0
Electric consumption (kWh/m³)		4.86	4.24	3.92	3.77	3.77	3.77	3.77	3.77	3.77
Depth (mm)		1,800	1,800	1,800	2,300	2,300	3,500	4,500	5,500	6,750
Width (mm)		7,500	7,500	7,500	7,500	7,500	7,700	7,700	7,700	7,700
Height (mm)		2,200	2,200	2,200	2,200	2,400	2,400	2,400	2,400	2,400

Pick UP

Operational monitoring can be implemented from a remote location (optional)

You can control equipment operation by capturing daily operational data into your PC. You can also monitor the data from a remote location by using the internet.

* Please enquire about applicable models.

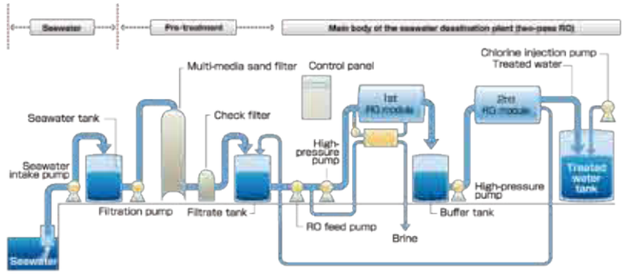
eco style A cost-reduced, environment-friendly energy-saving system

AWT has reached the conclusion that in order to popularize seawater desalination plants, it is mandatory to incorporate environment-friendly energy-saving systems into water treatment plants.

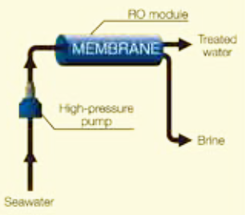
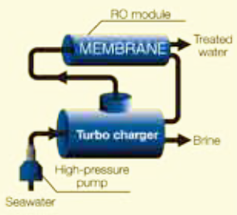
Power consumption per 1 m³ when compared with conventional systems

By using a new energy recovery system which reuses drainage pressure, we have been able to reduce power consumption by as much as 60% compared with conventional systems with no energy-saving system incorporated.

6.47kW/m³ → Power consumption reduced by 60% → 2.55kW/m³



Comparison between conventional seawater desalination systems and new seawater desalination systems

		No energy-saving system installed	Turbo charger installed	New energy recovery device
Flow				
High-pressure pump	Power consumption	27.0kWh	17.1kWh	9.5kWh
	Motor	30.0kW	22.0kW	11.0kW
	Feed volume	303.0m³/day	303.0m³/day	100.0m³/day
	Total head	630m	400m	630m
Booster pump	Power consumption	N/A	N/A	1.1kWh
	Motor	N/A	N/A	3.7kW
	Feed volume	N/A	N/A	203.0m³/day
	Total head	N/A	N/A	30m
Total power consumption		27.0kWh	17.1kWh	10.6kWh
Power consumption/m³		6.47kW/m³	4.11kW/m³	2.55kW/m³
Energy saving rate when compared with equipment with no energy-saving system installed			36.5%	60.7%

(For equipment with treatment capacity of 100 m3/d)

Brackish water desalination plant

The qualities of brackish water vary greatly depending upon the environment, but our order-made products are capable of handling all forms of brackish water.
We make safe water that can satisfy all of our customers.

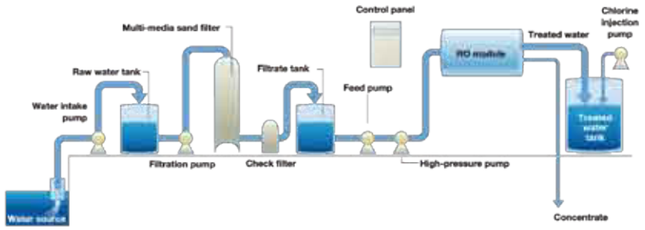
Brackish water desalination plant

ASWO-80P Standard type series

1,200m³/d	50m³/d
Maximum desalination volume	Minimum desalination volume

A design where toxic substances can be removed up to 99%

Strong at removing cryptosporidium bacteria and legionella bacteria



Capable of removing Escherichia coli O157 and giardia bacteria

Although the major purpose is to remove the salinity from brackish water and to produce high-quality drinking water, the equipment can also remove 100% of the destructive bacteria that would not get eliminated even when disinfected by chlorine such as cryptosporidium bacteria and giardia bacteria.

Removing toxic substances such as fluorine and arsenic

Heavy metal is difficult to remove through conventional procedures. AWT's reverse osmosis desalination systems are strong in removing such heavy metal substances, and are capable of removing toxic heavy metals such as fluorine and arsenic by 90-99%.

Name of model		80PI-75	80PI-100	80PI-150	80PI-200	80PI-300	80PI-400	80PI-500	80PI-600	80PI-700	80PI-800	80PI-1000	80PI-1200
Treated water volume	m³/d	75.0	100.0	150.0	200.0	300.0	400.0	500.0	600.0	700.0	800.0	1,000.0	1,200.0
	m³/h	3.1	4.2	6.3	8.3	12.5	16.7	20.8	25.0	29.2	33.3	41.7	50.0
Raw water intake volume	m³/d	150.0	166.0	230.0	267.0	400.0	533.0	667.0	800.0	933.0	1,067.0	1,333.0	1,600.0
	m³/h	6.3	6.9	8.3	11.1	16.7	22.2	27.8	33.3	38.9	44.5	55.5	66.7
Motor used (kW)		5.5	5.5	7.5	11.0	15.0	18.5	22.0	30.0	30.0	37.0	45.0	45.0
Shaft power (kW)		4.44	4.93	6.83	7.89	11.84	15.79	19.74	23.68	27.63	31.58	39.47	41.79
Depth (mm)		1,200	1,200	1,200	1,200	1,300	1,500	1,500	1,600	1,800	2,000	2,200	2,300
Width (mm)		5,000	5,000	5,000	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500
Height (mm)		1,800	1,800	1,800	1,800	2,000	2,000	2,000	2,200	2,200	2,400	2,400	2,400

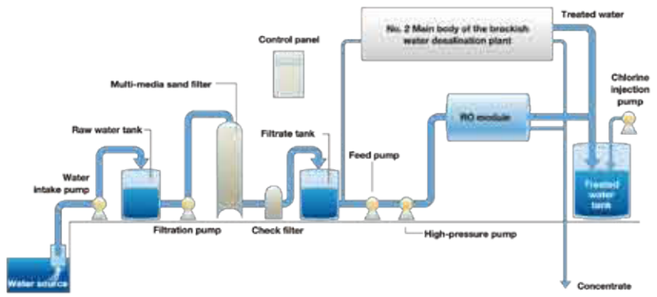
Brackish water desalination plant

ASWO-D Dual type series

1,200m³/d	200m³/d
Maximum desalination volume	Minimum desalination volume

Two systems can be operated separately in a single unit

A unit equipped with a spare system that can be used for emergencies



Operation ensured even during maintenance inspection

When using a single unit, equipment needs to be stopped during maintenance work or when parts are being replaced. By having 2 different systems within a single unit, maintenance inspections can be implemented without having to stop the entire desalination process.

Complete removal of toxic substances

Cryptosporidium bacteria, legionella bacteria, and even viruses can be removed completely. Additionally, heavy metals such as fluorine and arsenic can also be removed completely to produce pure and high-quality drinking water.

Name of model		80P-D200	80P-D300	80P-D400	80PI-D600	80PI-D800	80PI-D1000	80PI-D1200
Treated water volume	m³/d	200.0 100.0×2	300.0 150.0×2	400.0 200.0×2	600.0 300.0×2	800.0 400.0×2	1,000.0 500.0×2	1,200.0 600.0×2
Raw water intake volume	m³/d	332.0	460.0	534.0	800.0	1,067.0	1,333.0	1,600.0
	m³/h	13.8	19.2	22.3	33.3	44.4	55.5	66.7
Motor used (kW)		5.5×2	7.5×2	11.0×2	15.0×2	18.5×2	22.0×2	30.0×2
Shaft power (kW)		4.93×2	6.83×2	7.89×2	11.84×2	15.74×2	19.74×2	23.68×2
Depth (mm)		1,800	1,800	1,800	2,000	2,000	2,200	2,200
Width (mm)		7,500	7,500	7,500	7,500	7,500	7,500	7,500
Height (mm)		2,200	2,200	2,400	2,400	2,400	2,400	2,400

MF/UF membrane equipments

AWT produces not only equipment using RO membranes, but also MF/UF membrane equipment.
This equipment can produce safe drinking water from well water or river water with no salinity.
It can also be used for pre-treatment for seawater desalination plants or for reusing leachate water.

Please feel free to consult us regarding water volumes.
AWT will design and create equipment optimum for each customer.

Characteristic 1

The product is unitized for easy on-site installation.

Characteristic 2

It is easy to confirm operational status by concentrating on the operating equipment and measuring equipment.

Main Specifications

Type of membrane	Hollow fiber type membrane
Membrane materials	PE, PVDF
Pore diameter	0.03μm - 0.1μm
Effective membrane area	8m² - 50m²
Filtration methods	Dead end or cross flow
Filtration flow volume	0.4 -10 m³/hour
Backwash	Air or water backwash
pH range	1 - 10

Pre-treatment units

Seawater multi-media sand filter

Although the equipment has been created for seawater, it can also be used in pre-treatment procedures for water acquired from other sources, too.

Name of model	AMF-13	AMF-20	AMF-30	AMF-42	AMF-48	AMF-1600	AMF-1800	AMF-2200	AMF-2400
Filtrate volume (m³/h)	0.8~2.8	2.2~7.7	4.5~15.8	8.0~28.0	11.6~40.6	20.0~70.0	25.4~89.0	38.0~133.0	45.4~160.0
Material	FRP	FRP	FRP	FRP	FRP	Rubber lining	Rubber lining	Rubber lining	Rubber lining
Diameter (mm)	320	530	762	1,067	1,219	1,600	1,800	2,200	2,400
Height (mm)	1,519	2,027	2,192	2,304	2,409	3,500	3,500	3,800	3,800
Pipe diameter	25A(1")	40A(1 1/2")	50A(2")	80A(3")	80A(3")	100A(4")	100A(4")	150A(6")	150A(6")
Filter sand weight per unit (kg)	105	285	675	1,460	2,270	3,570	4,530	7,146	8,670
Dry weight per unit (kg)	118	345	759	1,680	2,550	4,730	5,840	8,896	11,120
Operating weight per unit (kg)	238	565	1,245	2,480	3,710	8,060	10,156	15,596	19,250

Pre-treatment units

Seawater desalination check filter

Name of model	CF-50-06S	CF-50-09	CF-75-18	CF-100-35	CF-100-50	CF-100-80	CF-100-120
Filtrate volume (m³/h)	5.0	7.2	21.6	56.0	80.0	128.0	192.0
Material	SUS316	FRP	FRP	FRP	FRP	FRP	FRP
Diameter (mm)	248	300	400	550	720	890	1,040
Height (mm)	935	815	1,260	1,430	1,660	1,750	1,830
Cartridge element quantity (pcs)	6	9	18	35	50	80	120
Pipe diameter	50A(2")	50A(2")	50A(2")	80A(2")	100A(4")	150A(6")	150A(6")
Dry weight (kg)	20	25	56	70	90	140	210
Operating weight per unit (kg)	55	75	190	320	540	800	1,250

CONTAINERIZED PACKAGE

For overseas transportation, we use 20ft and 40ft containers, in which we install the RO unit, allowing direct local installation.
This allows major cost reductions by removing the need to build structures to house the equipment, as well as simplifying the local construction process.
The SO series can handle up to 400m³/day unit,
whereas the WO series can handle up to 800m³/day unit.
It is also possible to use the container as a control room.