## DRINKING AND RO PRODUCT WATER

<table>
<thead>
<tr>
<th>Substances</th>
<th>WHO Guidelines</th>
<th>Typical Seawater</th>
<th>RO Product Water</th>
<th>2nd RO Product Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloride</td>
<td>CI&lt;sup&gt;+&lt;/sup&gt;</td>
<td>250.0</td>
<td>19,300 mg/l</td>
<td>121.2 mg/l</td>
</tr>
<tr>
<td>Total organic carbon</td>
<td>TOC</td>
<td>6.0 mg/l</td>
<td>0.3 mg/l</td>
<td>&lt;0.1 mg/l</td>
</tr>
<tr>
<td>Iron</td>
<td>Fe</td>
<td>0.3</td>
<td>0.1 mg/l</td>
<td>TRACe</td>
</tr>
<tr>
<td>Manganese</td>
<td>Mn</td>
<td>0.1</td>
<td>0.2 mg/l</td>
<td>0</td>
</tr>
<tr>
<td>Sulfate</td>
<td>SO&lt;sub&gt;4&lt;/sub&gt;</td>
<td>400.0</td>
<td>3,100 mg/l</td>
<td>13.0 mg/l</td>
</tr>
<tr>
<td>Sodium</td>
<td>Na</td>
<td>2000.0</td>
<td>10,837 mg/l</td>
<td>70.2 mg/l</td>
</tr>
<tr>
<td>Potassium</td>
<td>K</td>
<td>-</td>
<td>400.0 mg/l</td>
<td>3.4 mg/l</td>
</tr>
<tr>
<td>Silicon</td>
<td>SiO&lt;sub&gt;2&lt;/sub&gt;</td>
<td>-</td>
<td>2.1 mg/l</td>
<td>0.1 mg/l</td>
</tr>
<tr>
<td>Fluoride</td>
<td>F</td>
<td>1.5</td>
<td>0.02 mg/l</td>
<td>TRACe</td>
</tr>
<tr>
<td>Calcium</td>
<td>Ca</td>
<td>300.0</td>
<td>440.0 mg/l</td>
<td>1.8 mg/l</td>
</tr>
<tr>
<td>Magnesium</td>
<td>Mg</td>
<td>as CaCO&lt;sub&gt;3&lt;/sub&gt;</td>
<td>1,310.0 mg/l</td>
<td>5.8 mg/l</td>
</tr>
<tr>
<td>Bicarbonate</td>
<td>HCO&lt;sub&gt;3&lt;/sub&gt;</td>
<td>-</td>
<td>150.0 mg/l</td>
<td>1.3 mg/l</td>
</tr>
<tr>
<td>Total dissolved solids</td>
<td>TDS</td>
<td>1,000.0</td>
<td>35,541 mg/l</td>
<td>217.0 mg/l</td>
</tr>
<tr>
<td>Electric conductivity</td>
<td>pH</td>
<td>6.5~8.5</td>
<td>8.3</td>
<td>7.1</td>
</tr>
<tr>
<td>Bacteria</td>
<td>-</td>
<td>100/m&lt;sup&gt;3&lt;/sup&gt;</td>
<td>500.0</td>
<td>0</td>
</tr>
<tr>
<td>Total coliforms</td>
<td>-</td>
<td>0/100/m&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>Turbidity</td>
<td>NTU</td>
<td>5</td>
<td>4.0</td>
<td>&lt;1.0</td>
</tr>
</tbody>
</table>

## HEALTH EFFECTS AND WATER TREATMENT PROCESS

<table>
<thead>
<tr>
<th>Substances</th>
<th>WHO Guidelines</th>
<th>Health effects of excessive intake</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total coliform</td>
<td>Absent</td>
<td>Percol infectious disease, gastrointestinal tract disease.</td>
<td>Boiling, chlorination.</td>
</tr>
<tr>
<td>Arsenic</td>
<td>0.05 mg/l</td>
<td>Keratitis hypotension, Cirrhosis, affects nervous systems.</td>
<td>Discontinue consumption, Treatment by other process, New water source.</td>
</tr>
<tr>
<td>Hexavalent chromium</td>
<td>0.05 mg/l</td>
<td>Severe vomiting, diarrhea, kidney disease.</td>
<td>Discontinue consumption, Treatment by other process, New water source.</td>
</tr>
<tr>
<td>Nitrate</td>
<td>10 mg/l</td>
<td>Infantile methemoglobinemia in children under age 6 and respiration disorders.</td>
<td>RO treatment, New water source, Consumption for other use.</td>
</tr>
<tr>
<td>Nitrite</td>
<td>0.1 mg/l</td>
<td>Nervous system disorder - speech impediment, stomas laundry and urinets.</td>
<td>Demagnetization, New water source.</td>
</tr>
<tr>
<td>Manganese</td>
<td>250 mg/l</td>
<td>High concentration gives water and beverages undesirable tastes.</td>
<td>Brackish water RO process for concentration below 900ppm. Seawater RO process for concentration over 900ppm.</td>
</tr>
<tr>
<td>Calcium Magnesium</td>
<td>300 mg/l as CaCO&lt;sub&gt;3&lt;/sub&gt;</td>
<td>Excessive intake can cause gastrointestinal disorders. Hard water scale deposits on pipes increase soap consumption which is a nuisance and an economical burden. Not suitable for boiler water. Water of 10-100ppm hardness is palatable.</td>
<td>RO process.</td>
</tr>
<tr>
<td>pH</td>
<td>6.5~8.5</td>
<td>Direct relationship between human health and pH in drinking water is unknown. A measure of the acidity or alkalinity of water.</td>
<td></td>
</tr>
</tbody>
</table>
ASSOCIATES’S WATER TECHNOLOGY

Next standard for the earth

Building a Better Tomorrow for Water and People

Our watery planet, 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 operation 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-KO-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

ASSO-FI-TR

Large plant-type series

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.

2,000m³/d

250m³/d

Maximum desalination volume

Minimum desalination volume per unit

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 2,500 to 2,500 m³/day.

Our past delivery track record has established our superior reliability

Plants producing 4,000 m³/day or 9,000 m³/day operate in various countries all over the world. Despite being large-type equipment, they are modularized and can conveniently be 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.

<table>
<thead>
<tr>
<th>Name of model</th>
<th>SD-FI-250TTR</th>
<th>SD-FI-300TTR</th>
<th>SD-FI-350TTR</th>
<th>SD-FI-750TTR</th>
<th>SD-FI-1,000TTR</th>
<th>SD-FI-1,500TTR</th>
<th>SD-FI-2,000TTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treated water volume (m³/d)</td>
<td>250.0</td>
<td>300.0</td>
<td>350.0</td>
<td>750.0</td>
<td>1,000.0</td>
<td>1,500.0</td>
<td>2,000.0</td>
</tr>
<tr>
<td>Recovery rate (%)</td>
<td>57.0</td>
<td>57.0</td>
<td>57.0</td>
<td>57.0</td>
<td>57.0</td>
<td>57.0</td>
<td>57.0</td>
</tr>
<tr>
<td>Shaft power (kW)</td>
<td>48.0</td>
<td>59.0</td>
<td>59.0</td>
<td>59.0</td>
<td>59.0</td>
<td>59.0</td>
<td>59.0</td>
</tr>
<tr>
<td>Motor used (kW)</td>
<td>30.0</td>
<td>30.0</td>
<td>30.0</td>
<td>30.0</td>
<td>30.0</td>
<td>30.0</td>
<td>30.0</td>
</tr>
<tr>
<td>Energy saved (kW)</td>
<td>24.0</td>
<td>24.0</td>
<td>24.0</td>
<td>24.0</td>
<td>24.0</td>
<td>24.0</td>
<td>24.0</td>
</tr>
</tbody>
</table>

Seawater desalination plant

ASSO-KQ-TR

Easy to operate-type series

Designing concept with superior usability

Energy-saving device incorporated as standard system

220m³/d

65m³/d

Maximum desalination volume

Minimum desalination volume

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

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

Outstanding operability and usability by all

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

Name of model | SD-KQ-250TTR | SD-KQ-300TTR | SD-KQ-350TTR | SD-KQ-1,000TTR | SD-KQ-1,500TTR | SD-KQ-2,000TTR |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Treated water volume (m³/d)</td>
<td>65.0</td>
<td>110.0</td>
<td>120.0</td>
<td>130.0</td>
<td>150.0</td>
<td>220.0</td>
</tr>
<tr>
<td>Recovery rate (%)</td>
<td>57.62</td>
<td>57.62</td>
<td>57.62</td>
<td>57.62</td>
<td>57.62</td>
<td>57.62</td>
</tr>
<tr>
<td>Shaft power (kW)</td>
<td>35.0</td>
<td>35.0</td>
<td>35.0</td>
<td>35.0</td>
<td>35.0</td>
<td>35.0</td>
</tr>
<tr>
<td>Motor used (kW)</td>
<td>20.0</td>
<td>20.0</td>
<td>20.0</td>
<td>20.0</td>
<td>20.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Energy saved (kW)</td>
<td>8.18</td>
<td>8.18</td>
<td>8.18</td>
<td>8.18</td>
<td>8.18</td>
<td>8.18</td>
</tr>
</tbody>
</table>

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.

How long is the reverse osmosis membrane life 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-FDI-TR

All-in-one-type series

Plants for producing freshwater directly from seawater
Using 2-pass RO system!

2,000m³/d

Maximum desalination volume

50m³/d

Minimum desalination volume

High 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 503.0 ppm of treated water. The highly flexible features of this 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 equal-quality water with that produced by the evaporation method. The RO method has lower costs when considering initial cost and running costs.

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

AIHT 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 reduces drainage pressure, we have been able to reduce power consumption by as much as 80% compared with conventional systems with no energy-saving system incorporated.

Comparison between conventional seawater desalination systems and new seawater desalination systems

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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 inquire about applicable models.*
Brackish water desalination plant

ASW0-80P Standard type series

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, it is also possible to remove other toxic substances. This design is capable of removing destructor bacteria that would not get eliminated even when disinfected by chlorine such as cryptosporidium bacteria and giardia bacteria.

Removing toxic substances such as fluoride and arsenic

Heavy metal is difficult to remove through conventional procedures. ASW0 reverse osmosis desalination systems are strong in removing such heavy metal substances, and are capable of removing toxic heavy metals such as fluoride and arsenic by 90-95%.

<table>
<thead>
<tr>
<th>Brackish water desalination plant</th>
<th>ASW0-D Dual type series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two systems can be operated separately in a single unit</td>
<td></td>
</tr>
<tr>
<td>A unit equipped with a spare system that can be used for emergencies</td>
<td></td>
</tr>
</tbody>
</table>

Operation ensured even during maintenance inspection

When using a single unit, equipment needs to be stopped during maintenance work or when parts are replaced. However, the ASW0 type is capable of operating in parallel using two units. In the case of a single unit, maintenance inspections can be made while the system is in operation, 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 fluoride and arsenic can also be removed completely to produce pure and high-quality drinking water.
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 quote equipment optimum for each customer.

### Main specifications

| Characteristic 1 | The product is utilized for easy on-site installation. |
| Characteristic 2 | It is easy to confirm operational status by concentrating on the operating equipment and measuring equipment. |

#### Type of membrane
- Hollow fiber type membrane

#### Membrane materials
- PE, PVDF

#### Pore diameter
- 0.002µm - 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.

#### Pre-treatment units

#### Seawater desalination check filter

For overseas transportation, we use 20ft and 40ft containers, in which we install the RO unit, allowing either local installation. Thisallows major cost reductions by removing the need to build structures to house the equipment, as well as simplifying the local construction process. The RO series can handle up to 420m³/day unit, whereas the WQ series can handle up to 850m³/day unit. It is also possible to use the container as a control room.