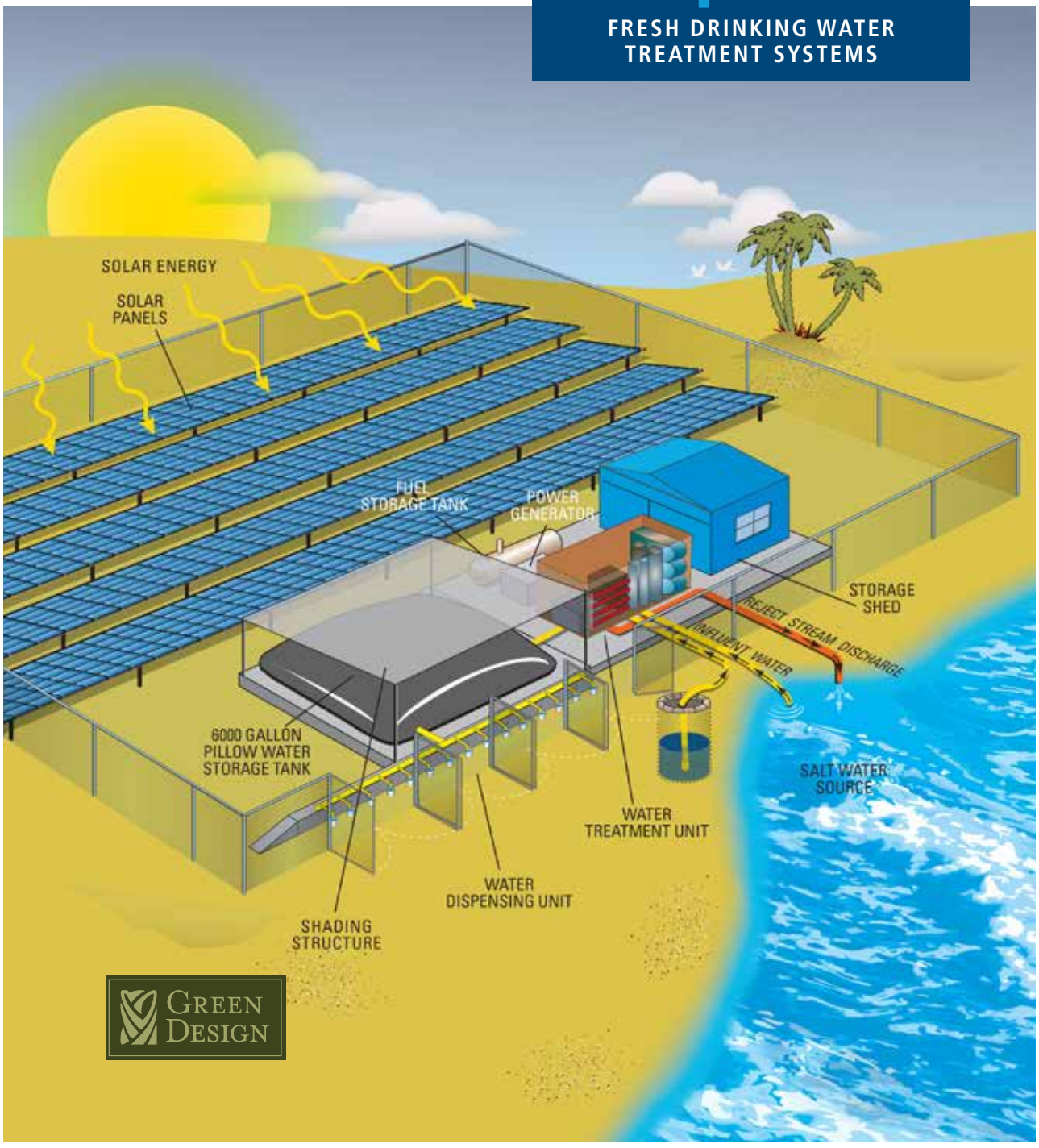
AquaSalt™

FRESH DRINKING WATER TREATMENT SYSTEMS



Clean water from clean energy sources

APPLICATIONS FOR TREATMENT

- Seawater or ocean water sources
- Removes salinity
- Provides drinking water for remote sites
- Solar power provides clean renewable energy
- Underground brackish water sources
- Removes turbidity
- Perfect for green design applications
- Holistic approach to land resource usage

AQUALTRA™ TECHNOLOGIES

AquaSalt™

AquaSalt™ Treatment Units for Commercial / Industrial Applications; or as systems that provide an economical solution for supplying fresh drinking water to remote areas through the use of solar energy.

All dimensions given are approximate and are rounded.

AquaSalt Water Treatment System Description

The AquaSalt water treatment system is capable of treating salt water from a surface body or from a groundwater source to provide a product suitable for drinking and for domestic use. AquaSalt provides a moderate cost solution which meets or exceeds EPA and other governmental quality and health standards. Treatment based on the concept of reverse osmosis is designed to supply 29-34 m3 (7600-9000 gallons) per day per treatment module for up to 500 users (depending on the salinity of the feed water). Each user will receive 50 liters of potable water per day. This is based on dispensing 25 liters in the morning and 25 liters later in the afternoon. Treated water is dispensed into two 3.5-gallon basket containers that will be carried by the user for daily use. The AquaSalt dispensing unit has the capability of dispensing stored treated water to 15 users simultaneously. The objective is to allow all 500 users to fill their buckets during a one-hour period in the morning and during a one-hour period in the late afternoon. This system is fully scalable into a multi-modular system in order to substantially augment the quantity of treated water to meet to meet the needs and specific requirements of the customer. When operated with solar power it can be expected to pay for itself through energy savings in a few years, depending on the configuration required and the amount of sunlight available.

Applications of AquaSalt Systems

- In remote regions near an available salt water or brackish water source (close proximity to sea or ocean water)
- By organizations and relief agencies working to bring fresh drinking water to developing countries
- At remote exploration sites by companies and government agencies to meet the water needs of their employees
- By communities seeking to implement self-sustaining infrastructure both from the resource and energy standpoints
- By individuals interested in implementing green design technology in their surroundings
- By anyone interested in achieving independence from local water authorities
- To remove undesirable inorganic salts and elements as well as low molecular weight organics
- Clean and silent operation with no harmful emissions when powered by solar energy

Water parameters removed by the AquaSalt System

- Salts
- Turbidity
- Odor
- Algae
- Inorganic contaminants
- Chlorinated hydrocarbons
- Bacteria
- Low molecular weight organic contaminants

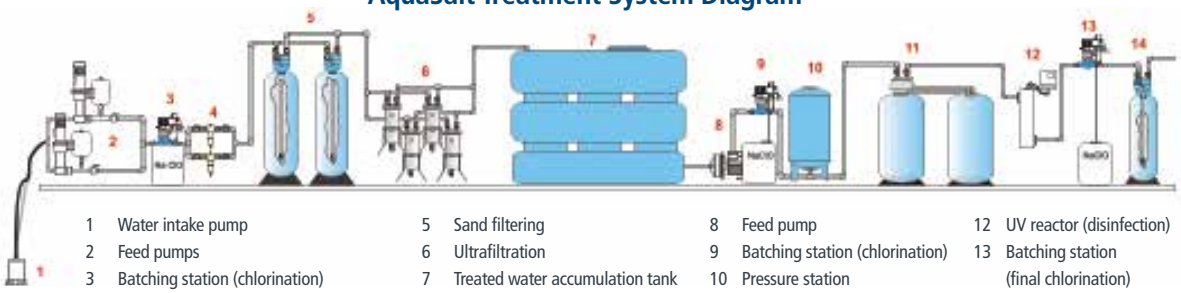
Land Area Requirements for H2O Treatment Volume

6,000 GALLONS/DAY	12,000 GALLONS/DAY
Surface Water Source	
140 ft x 170 ft (43m x 52m)	200 ft x 170 ft (61m x 52m)
Groundwater Source	
140 ft x 178 ft (43m x 55m)	200 ft x 186 ft (61m x 57m)

Power Requirements for System Operation

The AquaSalt water treatment system provides the capability of optimizing energy usage by utilizing a combination of available energy sources. AquaSalt is designed to be an autonomous system that can be operated with solar power, through the use of a power generator or by connection to the existing electrical power grid. The choice of method for supplying energy to the facility depends on the number of sunny days in the area to be serviced compared to the economics of using either fuel or electrical power where available. In the case of using solar energy, Aqualtra's system design ensures that the batteries' stored energy absorbed by the solar panels is capable of supplying power for up to 6 days. At this time, if the batteries have not been recharged by solar power, the electric backup power generator would automatically start and provide energy for the pumps. A 1,000-gallon fuel storage tank, installed near the power generator, will store enough fuel to operate the system over a period of 31 days. Please note that the 1,000-gallon capacity tank will provide fuel for 24 hour continuous power operation thus producing 9,000 gallons of treated water.

AquaSalt Treatment System Diagram



1 Water intake pump
2 Feed pumps
3 Batching station (chlorination)
4 Mechanical filter with backwash function
5 Sand filtering
6 Ultrafiltration
7 Treated water accumulation tank
8 Feed pump
9 Batching station (chlorination)
10 Pressure station
11 Charcoal filtering
12 UV reactor (disinfection)
13 Batching station (final chlorination)
14 Mixing tank

Monitoring and Operation of the AquaSalt System

Operation requires the presence of an attendant for one hour in the morning shift and one hour in the afternoon shift for treatment monitoring, water sampling and analysis purposes. Attendant is required two hrs/wk for the filtration system maintenance. The solar based community system requires his/her presence during the dispensing activities, two hours in the morning and two hours in the afternoon.

Treatment Technology

The water in the AquaSalt Water Treatment Unit is subjected to the following treatment processes prior to production of the treated water for storage and use as potable water.

NOTE The number of solar panels depicted on the front cover illustration is designed to produce a maximum of 9,000 gallons of water when the AquaSalt treatment system is operated continuously over a 24-hour period with water pumped from a surface source. The pillow tank shown in the illustration has a storage capacity of 6,000 gallons of water produced by the AquaSalt treatment system operating over a continuous 18 hour period. A second pillow tank would be required to store the additional 3,000 gallons of treated water that would result from 24 hours of continuous system operation.

Operator Responsibilities

- Regeneration of reverse osmosis membranes on a weekly or biweekly basis depending on the quality of the water being treated
- Monitors the AquaSalt treatment system to ensure that all unit operations are functioning properly
- Monitors the quality of the water produced to ensure it meets health quality requirements for public consumption
- Supervises the water dispensing process

Location and Space Requirements

The AquaSalt unit and associated treatment system is installed on a solid concrete foundation. The treatment unit dimensions and weight are: 6.06m x 2.44m x 2.44m (21'65" x 8' x 8') (L x W x H), 6 Metric Tons (empty), 8 Metric Tons (during operation). The solar panels will also be anchored in concrete. The storage shed will contain the backup batteries, electrical utilities, chemicals, buckets and other needed equipment. Approximate land space dimensions required for basic operation of the system when using surface water are 140' x 170' (43m x 52m) for a system containing solar panels.

NOTE A different size of submersible pump and installation configuration would have to be installed in the event water is to be pumped from the ground for treatment or if the system is to be located in an inland area away from the sea or the ocean that usually provides a disposal method for the reverse osmosis reject stream. The number and size of solar panels for this system would be determined based on the pumping requirements and on the safe yield of the proposed water well at any particular geographic location.

Considerations for Use of Groundwater vs. Surface Water for Treatment

- Use of water from a groundwater source near a surface body of water is desirable especially in hot, arid and tropical climate zones since underground water is cool and will allow the AquaSalt treatment system to function under optimal conditions.

- Use of groundwater allows location of the treatment facility at a greater distance from a flowing body of water and outside the intertidal zones, especially if the facility is to be constructed for a long term-period.
- Use of groundwater is desirable since floating debris could damage the pumping system.
- Planktons and algae are usually eliminated from water by the natural ground filtration process, thus less energy and chemicals are required.

Uses

- Treatment of salt water from sea or ocean sources
- Treatment of brackish water from underground sources
- Removal of salinity and turbidity
- Removal of undesirable chemical elements
- Perfect for green design applications
- Powered by solar energy for use in holistic applications
- Supplies up to 6,000 gallons (23 m3) of drinking water per day in places devoid of any central supply (construction sites, remote locations)

Advantages

- Independent operation
- Solar power provides clean renewable energy
- Automatic generator or grid backup
- Space saving design
- Moderate price
- Fully scalable for varying requirements
- Drinking water dispensing system (15 taps)

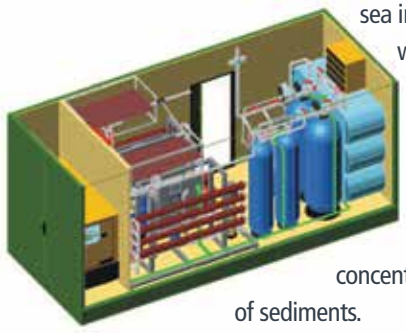
General Parameters

Salt water treatment unit designed for desalination and disinfection to supply fresh drinking water. The treatment module has a feed rate of 3.0 m3/hr (790 gallons/hr). The output from the treatment unit ranges from 1.2 m3/hr (317 gallons/hr) and 2.0 m3/hr (528 gallons/hr) depending on the salinity of the feed water. That satisfies water supply for up to 500 people per day* (scalable to 750 people by adding more solar panels and an additional 3,000-gallon water storage tank). Approximate land space dimensions required: 140 ft x 170 ft (43m x 52m). Pumping rate into the treatment system is rated at 3.0m^3/hr (790 gallons/hr). The output from the treatment system will range from 1.2m^3/hr (317 gallong/hr)-2m^3/hr (528 gallons/hr) depending on the salinity of the water entering the system. Contact us for specific information concerning other capacities required.

*Based on supplying approximately 13 gallons (50 liters) of water per person per day.

System Performance

The AquaSalt water treatment system provides clean, fresh drinking water from salt water sources for use in remote areas where fresh drinking water is not readily available. AquaSalt's operating system is based on scientifically proven reverse osmosis technology. It uses space saving energy-efficient components to deliver a maximum capacity output of fresh water from a compact system design in a cost-effective manner. The use of solar power provides clean and silent operation with no harmful emissions for a holistic approach to green design. A combination of treatment technologies including mechanical filtration, multimedia sand filtration, softening treatment, reverse osmosis and disinfection are used in tandem to achieve superior results. Water to be processed is pumped to the system via a submerged pump from an existing source such as an ocean or sea intake or from a nearby ground water well. The incoming water is treated by the patented AquaSalt treatment system and then disinfected prior to storage and distribution. AquaSalt moderate cost solution water treatment plants are not intended for use in treating water that contains high concentrations of chlorine or high concentrations of sediments.



ON THE COVER The depicted treatment system has the capability of producing up to 7,600-9,000 (28.8-34.1m^3) gallons of water daily when operated continuously. It can provide drinking water for up to 500-750 people depending on the salinity of the feed water. This scenario would require an increase in the number of solar panels, additional land area and a second pillow type water storage tank with a volume of 3,000 gallons.

AQUALTRA™ TECHNOLOGIES

info@aqualtra.com | www.aqualtra.com
3838 OAK LAWN AVENUE | SUITE 1000 | DALLAS TEXAS 75219 | 972.971.9755 PHONE | 469.317.6301 FAX