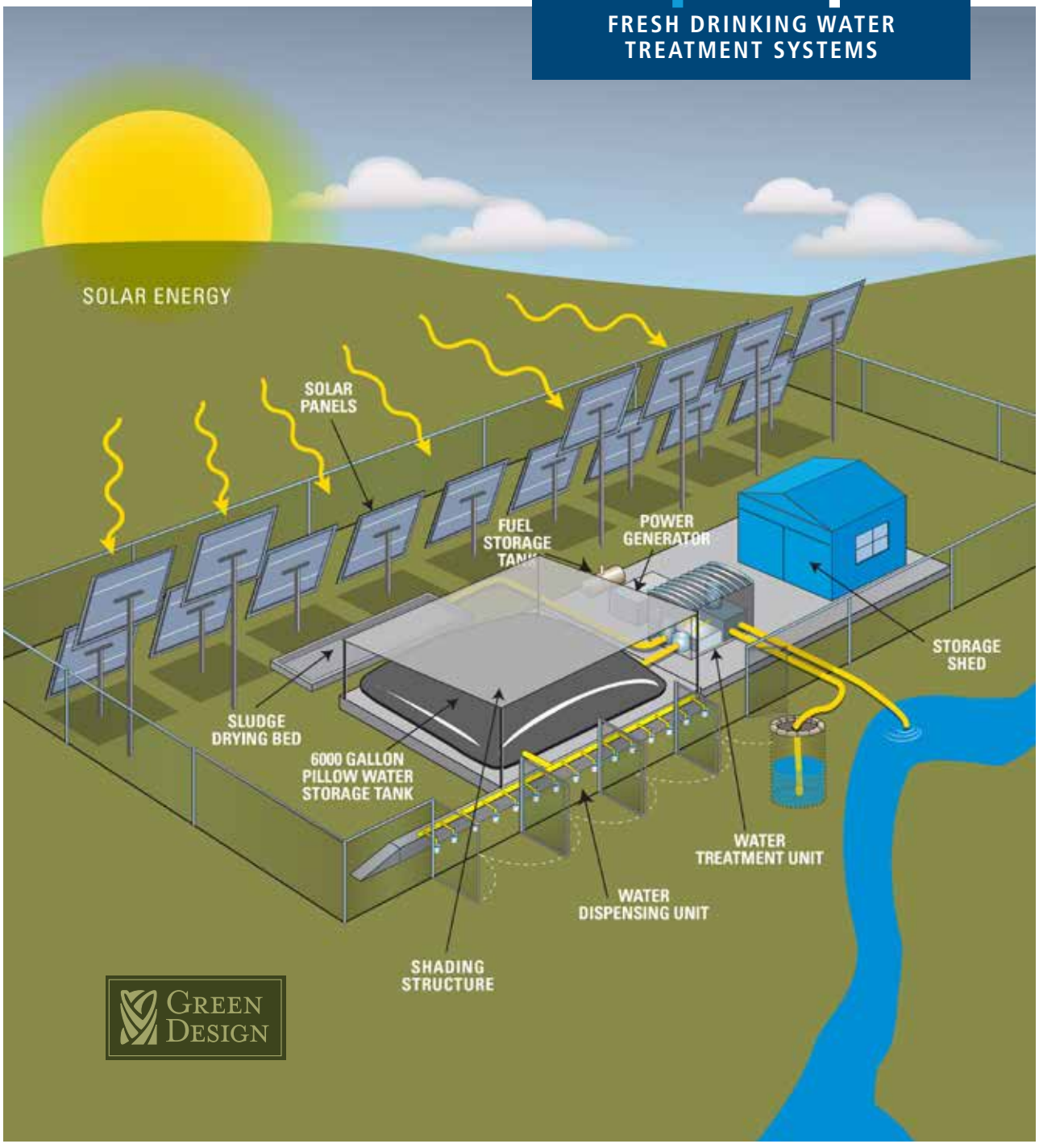
AquaAlpha™

FRESH DRINKING WATER
TREATMENT SYSTEMS



Clean water from clean energy sources

APPLICATIONS FOR TREATMENT

- Water from surface sources
- Water from underground sources
- Removes turbidity
- Holistic approach to land resource usage
- Provides drinking water for remote sites
- Perfect for green design applications
- Solar power provides clean renewable energy

AQUALTRA™
TECHNOLOGIES

AquaAlpha™

AquaAlpha™ 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.

AquaAlpha Treatment Systems Description

The AquaAlpha water treatment system is capable of treating water from a surface body or from a groundwater source to provide a product suitable for drinking and for domestic use. AquaAlpha provides a low-cost solution which meets or exceeds EPA and other governmental quality and health standards. Treatment based on the concept of chemical coagulation and flocculation is designed to supply water up to 45.4 m3 (12,000 gallons) per day per treatment module for up to 500 users on a daily basis. 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 bucket containers that will be carried by the user for daily use. The AquaAlpha dispensing unit has the capability of dispensing stored and 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 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 AquaAlpha Systems

- In remote areas near an available fresh water body source (lake or river)
- 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 individuals interested in implementing green design technology in their surroundings
- By entities interested in achieving independence from local water authorities
- To remove undesirable chemical elements from water such as nitrites, color and hardness
- By communities seeking to implement self-sustaining infrastructure both from the resource and the energy standpoints

Water parameters removed by the AquaAlpha system

- Color
- Turbidity
- Odor
- Nitrites
- Ammonium ions
- Chlorides
- Chemical oxygen demand (COD)
- Sulfates
- Manganese
- Iron
- Magnesium
- Calcium
- Hardness

The AquaAlpha System has been proven to disinfect water by eliminating the following microorganisms

- Coliform types of bacteria
- E. Coli bacteria
- Clostridium perfringens bacteria
- Enterococci bacteria
- Pseudomonas aeruginosa bacteria

Power Requirements for System Operation

The AquaAlpha water treatment system provides the capability of optimizing energy usage by utilizing a combination of available energy sources. AquaAlpha is designed to be an autonomous system that can be operated with solar power, through the use of a fuel 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 obtained from the solar panels is capable of supplying power for up to six days. At this time, the electric backup power generator would automatically start and provide energy for the pumps. A fuel storage tank, installed near the power generator, will carry enough fuel to operate the generator continuously over a period of 28 days.

Monitoring and Operation of the AquaAlpha 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. Operator responsibilities:

- Ensures that the recommended solutions are added to the treatment unit in accordance with the operation manual
- Monitors the AquaAlpha treatment system to ensure that all unit operations are functioning properly
- Monitors the quality of the water produced to ensure it meets the health quality requirements for public consumption
- Organizes the water dispensing process

Location and Space Requirements

The AquaAlpha unit and associated treatment system is installed on a solid concrete foundation. The treatment unit dimensions and weight are: 2,25m x 1,40m x 2,10m (7'.38" x 4'.59" x 6'.89") (L x W x H), 800 Kg (1,764 lbs). The solar panels will also be anchored in concrete. The storage shed contains 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 94' x 45' (29m x 14m) for a system containing 15 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. 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.

Treatment Capacity

The depicted treatment system has the capability to produce up to 45.4 m3 (12,000 gallons) of water daily when operated continuously.

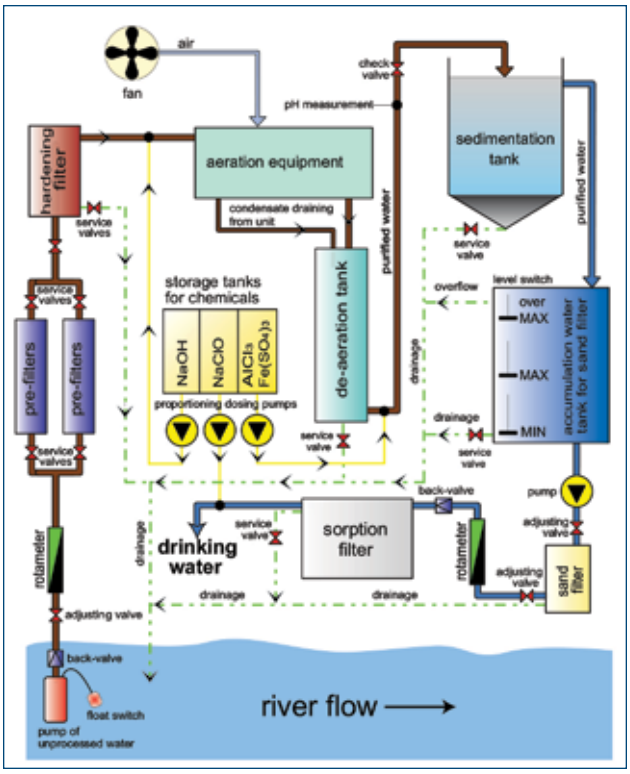
Treatment Technology

The water in the AquaAlpha Water Treatment Unit is subjected to the following treatment processes prior to the transfer of the treated water for storage and use as potable water:

- Aeration
- Deaeration
- Coagulation
- Flocculation
- Sedimentation
- Sand filtration
- Sorption filtration
- Disinfection

NOTE The number of solar panels depicted on the front cover illustration is designed to produce a maximum of 12,000 gallons of water when the AquaAlpha 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 AquaAlpha treatment system operating over a continuous 12 hour period. A second pillow tank of equal capacity would be required to store the additional 6,000 gallons of treated water that would result from 24 hours of continuous system operation.

AquaAlpha Treatment System Diagram



Land Area Requirements for H2O Treatment Volume

6,000 GALLONS/DAY	12,000 GALLONS/DAY
Surface Water Source	
50 ft x 85 ft (15m x 26m)	70 ft x 85 ft (22m x 26m)
Groundwater Source	
70 ft x 85 ft (22m x 26m)	110 ft x 85 ft (34m x 26m)

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 AquaAlpha treatment system to function under optimal conditions. For optimum efficiency, influent water temperature should not exceed 25ºC (77ºF).
- Use of groundwater allows for the location of the treatment facility at a greater distance from a flowing body of water and outside the 100-year flood flow elevations, especially if the facility is to be constructed for a long-term period.
- Use of groundwater is desirable in the absence of mechanisms to protect the pumps from floating debris.
- Planktons and algae are usually eliminated from water by the natural ground filtration process, thus requiring less energy and chemicals for treatment.

Uses

- Treatment of water from surface sources
- Treatment of water from underground sources
- Removal of undesirable chemical elements
- Perfect for green design 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
- Low energy consumption
- Solar power provides clean energy
- Automatic generator or grid backup
- Space-saving design
- Affordable price
- Fully scalable for varying requirements

Process Description

- Pumping station output @ 580 gallons/hr. (2.2 m3/hr)
- Flocculation with caustic soda
- Oxidation/coagulation by aeration
- Chemical coagulation with aluminum sulfate
- Sedimentation
- Sand filtration for removal of fine particles
- Activated carbon treatment for removal of color and odor
- Disinfection with sodium hypochlorite
- Water storage in a 6,000 gallon (23 m3) pillow tank
- Sludge drying using de-watering bed
- Drinking water dispensing system (15 taps)

General Parameters

Fresh drinking water treatment unit designed to disinfect and supply water for up to 500 people per day.* Approximate land space dimensions required: 94' x 45' (29m x 14m). 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 AquaAlpha water treatment system provides clean, fresh drinking water from surface or ground water supplies for use in remote areas where fresh drinking water is not readily available. AquaAlpha's operating system is based on scientifically proven coagulation processing 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 oxidation, sedimentation, filtering and sorption are used together to achieve superior results. Water to be processed is pumped to the system via a submerged pump from an existing source such as a lake, river or nearby ground water well. The incoming water is treated by the AquaAlpha treatment system and then disinfected prior to storage and consumption.

AquaAlpha water treatment plants are not intended for use in treating water that contains organic pollutants, nitrates or dissolved inorganic salts.

ON THE COVER The depicted treatment system has the capability of producing up to 12,000 gallons of water daily when operated continuously. It can provide drinking water for up to 1,000 people. 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 6,000 gallons.

AQUALTRA™ TECHNOLOGIES

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