



AQUA ROVER



1. ABOUT AQUA ROVER

1.1 GENERAL

Aqua Rover is a compact and versatile water purification and desalination system, coupled on a 4x4 mobile platform. Sophisticated technologies converge and integrated through artificial intelligence application to control the process to ultra-filter and desalinate any type of water source to potable water instantaneously.

1.2 ALL-IN-ONE

- Combine all elements needed to produce high quality drinking water from any possible water source
- Plug and play configuration
- Purification Capability :
 - Fresh water source : Up to 140,000
Liters per Day (LT/D) = 140m³
 - Sea water source : Up to 20,000
Liters per Day (LT/D) = 20m³



CHARACTERISTICS OF THE SYSTEM

- Light weight: 2,315 pound / 1,050 Kg (Dry)
- Small dimension: easy to store, easy to carry and can be airlifted
- Top speed: 40 KPH
- Uses 12V low voltage system
- Operating time up to 80 hours without refueling*
- Mobile, self-contained independent and automatic
- Deployment: less than 30 minutes, by 2 person
- Control & Analyzers for continuous and stable supply drinking water
- Advanced control system: reduces the need for operator attendance
- Integrated water storage tank
- Integrated water distribution system
- Produces drinking water at WHO water standards



BASIS OF DESIGN

This proposal is offered based on the following water design values from N/R to be used for. Unless otherwise specified, the equipment has been designed to operate outdoors, at ambient temperatures less than 48°C and elevations less than 3500 meters.

Influent Quality: The design solution proposed is based on the values below. All values are as mg/l unless otherwise stated.

Parameter	Source- 1
pH, standard units	5.0- 10.0
Specific Conductance, at 25°C, $\mu\text{S}/\text{cm}$	10 – 45,000
Sulfur, Total, as SO_4 , ppm	0 - 150
Chloride, as Cl, ppm	0- 19,500
Calcium as Ca, ppm	0-415
Sodium, as Na, ppm	0-10,500
Magnesium as Mg, ppm	0-1,300
Barium, Total, as Ba, ppm	0 - 50
Free Chlorine, ppm	0 - 15
Iron, Dissolved, as Fe, ppm	30
Nitrite, as NO_2 , ppm	400



Fluoride, as F, ppm	12
CO ₂	400
Total Organic Carbon (TOC)	5
Dissolved Organic Carbon (DOC)	10
Turbidity, NTU	30
Feed Water Source	Any
COD	3
BOD5	3
Total Suspended Solids	120
Total Dissolved Solids, ppm	35,000
Notes:	
N/R = data for this parameter has not been reported, and will be assumed to be 0 (zero)	
Parameters marked with an asterisk have been assumed.	

INFLUENT FLOW DATA

Flow rate, pressure and temperature required at inlet to the equipment.

	Minimum	Maximum
Inlet Flow rate (m ³ /hr)	2.5	7
Pressure (bar)	0	3
Temperature (°C)	3	37
Average Daily Flow (m ³)	20	100
Maximum Daily Flow (m ³)		140
Maximum Monthly Flow (m ³)	580	4,060
Peak Hourly Flow (m ³)	8	



PRODUCT WATER / EFFLUENT QUALITY

The following performance parameters are expected upon equipment start-up, based on the data listed in the influent quality table and design sections above (sea water).

Parameter	Value
Flow (m ³ /hr.)	
- Sea Water Source:	0.8
- Fresh Water Source:	4
Pressure (minimum bar)	1.5
pH, standard units	6.5-7.5
Total Hardness as CaCO ₃ , ppm	25-125
Silica as SiO ₂ , ppm	Max 0.2
Chloride as Cl, ppm	Max 0.5
Iron as Fe, ppm	Max 0.1
Turbidity (NTU)	0.5
Total Dissolved Solids (TDS)	150



INLET WATER VARIABILITY.

In the event that the influent water exceeds the specifications used in engineering this proposal or the water source changes, the ability of the water treatment system to produce the designed treated water quality and/or quantity may be impaired. Customer may continue to operate the system, but assumes the risk of damage to the system and/or additional costs due to increased membrane cleanings and consumable usage. Additional supplemental equipment can be purchased from AQUA ROVER, which in certain cases can restore normal production rates and minimize system damage.

RAW WATER QUALITY COMPLIANCE

The values in the table above indicates the quality of the raw water enter to the system, note that the values of the various parameters are not based on any analysis of any kind, and these will require, in order to adjust the system. In case of very high TDS in the raw water, the production capacity will be lower than the spec.



TECHNICAL & ENGINEERING DETAILS



RANGER DIESEL	
Maximum Weight Capacity	1424 lbs. (646 kg) (including operator, passenger, cargo, accessories)
Dry Weight	1430 lbs. (649 kg)
Test GVW - Rollover Protection System (ROPS)	3400 lbs. (1542 kg) per OSHA 29 CFR 1928.53
Fuel Capacity	10 gal. (37.8 l)
Engine Oil Capacity	3 qts. (2.8 l)
Coolant Capacity	5.4 qts. (5.11 l)
Towing Capacity	2000 lbs. (907 kg)
Hitch Tongue Capacity	150 lbs. (68 kg)
Max. Cargo Box Load*	1000 lbs. (454 kg)
Overall Length	116 in. (295 cm)
Overall Width (box)	60 in. (152.4 cm)
Overall Width (tires)	58 in. (147.3 cm)
Overall Height	76 in. (193 cm)
Wheelbase	81 in. (205.7 cm)
Cargo Box Dimensions (Inside)	36.5 x 54 x 11.5 in. (93 x 137 x 29 cm)
Ground Clearance	12 in. (30.5 cm)
Min. Turning Radius	161 in. (409 cm)
Engine	KOHLER liquid-cooled 3 cylinder diesel
Displacement	1028 cc
Bore x Stroke	75mm x 77.6mm
Alternator Output	12V DC 110A
Compression Ratio	22.8:1
Starting System	Electric

RANGER DIESEL	
Fuel System	Mechanical fuel injection
Front Suspension	Dual A-arm w/10 in. (25.4 cm) of travel
Rear Suspension	Independent w/10 in. (25.4 cm) of travel
Lubrication System	Full pressure with full flow filter
Driving System Type	PVT, 4-wheel independent shaft, lockable differential
Shift Type	Single Lever (H/L/N/R/P)
Transmission Gear Ratio - High	Front 3.10:1 / Rear 9.26:1
Transmission Gear Ratio - Low	Front 7.62:1 / Rear 22.79:1
Transmission Gear Ratio - Reverse	Front 6.83:1 / Rear 20.41:1
Front Drive Ratio	3.818:1
Tire Size - Front	25 x 10 - 12+ (26 x 9 - 12 for select models)
Tire Size - Rear	25 x 11 - 12 (26 x 11 - 12 for select models)
Tire Pressure - Front	10 psi (69 kPa)
Tire Pressure - Rear	12 psi (83 kPa)
Brakes, Front/Rear	Foot Activated, 4 wheel hydraulic disc
Hood Headlight	2 single beam, 50W, quartz/halogen
Taillights	10 L.E.D. (.28W)
Brake Light	10 L.E.D. (3.1W)



GENERAL DESCRIPTION

GENERAL

The proposed process is based on a combination of technologies, which together complement the river, lake, brackish or sea water treatment and suitability for drinking water, using chemical and physical technologies.

The whole process is prefabricated, ready for operation including the control system and filtration systems.

The system ensures a controlled flow of drinking quality water, with continuous monitoring of water quality and disinfection the purified product using an oxidizer, to ensure panning of the possible development of microorganisms.





STEP 1

1ST' DISINFECTION SYSTEM USING CHLORINE REACTOR

This stage is designed to disinfect microorganism from the 1st' filtrate effluent, this process insure the safety of the water from beginning of the entire process. The stage takes place in suction unit float on raw water, by adding Sodium Hypochlorite to the water.



STEP 2

RAW WATER PUMP

The pump is using to pump the raw water source to the treatment system. The pump can suck the raw water and elevate it up to 6 meter, and boost it to the system.



STEP 3

75-MICRON FILTRATION

Next filter stage, designed to ensure a high filtration degree, this filtering stage is intended to ensure that particles larger than 150 microns will not reach the Activated Carbon Filter.



STEP 4

HEAT EXCHANGER

The device is being use to stabilize the temperature of the raw pre-treated water. It also enables the field sanitation of the pre filtration.



STEP 5

ULTRA-FILTRATION

In that stage the treated pre filtered raw water separate from all sub-micron particles. The hart of the stage is pressurized PVDF membrane with cut-off filtration ability of 200 Dalton. The main aim of that stage is to extremely reduce suspended solids, turbidity & SDI, to the level below 3. This action will ensure the stability of the water quality produced and use to drinking or as inlet water to the reverse osmosis unit.



STEP 6

AC 5-MICRON FILTRATION

Next filter stage, designed to ensure a high filtration degree, this filtering stage is intended to ensure that particles larger than 5 microns will not reach the reverse osmosis membrane system, or to the permeate water supply, if RO is not being use. Also to remove colloidal and oxidizer to prevent RO module degradation.





STEP 7 **REVERSE OSMOSIS**

In fact, the RO system is the center of the water treatment process. It significantly improves the quality of water by reducing the total dissolved solids. The quality of the permeate water is adjustable by mixing with UF filtered raw water.



STEP 8 **2ND' DISINFECTION SYSTEM USING CHLORINE REACTOR**

This stage is designed to disinfect microorganism from the RO permeate water, this process insure the safety of the water storage. The stage takes place in the permeate supply system, by adding Sodium Hypochlorite to the product water.



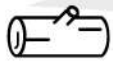
STEP 9 **STORAGE SYSTEM**

This stage designed to be a buffer for the permeate drinking water, it make sure that water can be supply regardless RO/UF unit operation. Also enable to maintain the treatment system regardless supply drinking water.



STEP 10 **SUPPLY SYSTEM**

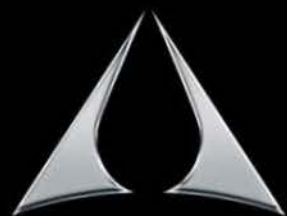
This stage designed to enable using drinking water from the storage system with the desire pressure, to the users. It also contains the final block AC filter, to ensure no oxidizer in the drinking water.



STEP 11 **Activated Carbon**

This stage designed to remove all oxidizing matter from the water supply to the users, it also can be modified to add minerals to the water supply, in case of continuous operation and drinking desalinate water.





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