SkyHydrant®

ULTRAFILTRATION UNIT

> MAX > GEM

USER GUIDE
DATA SHEET

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SkyJuice FOUNDATION

Safe Water for Every Child

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SkyHydrant®
ULTRAFILTRATION UNIT

SkyHydrant-MAX

Nominal 12,000 litres per day

Height - 143 cm
Depth - 18 cm
Width - 25 cm
Mass (dry) - 13 kg
Mass (wet) - 32 kg

SkyHydrant-GEM

Nominal 6,000 litres per day

Height - 82 cm
Depth - 18 cm
Width - 25 cm
Mass (dry) - 9 kg
Mass (wet) - 21 kg

SkyHydrant®
ULTRAFILTRATION UNIT

OPERATING INSTRUCTIONS

SkyHydrant ultrafiltration units are ideal for supplying drinking water in remote locations from both surface and ground water supplies. SkyHydrants can be setup and operated by non-technical persons and require no power or replacement filters.

SKYHYDRANT SETTING UP

Select a secure undercover location for the SkyHydrant sheltered from sun and rain and install in an upright position. The site should be located in a well-drained position with access to a disposal area for the discharge of backwash water.

A maintenance person should undertake daily cleaning and servicing of the unit to ensure it's continuous operation. Log sheets should also be completed to record water production and to schedule servicing of the unit.

SKYHYDRANT ASSEMBLY

Connect the Cleaning Handles

Unwind the head shaft a few turns anticlockwise to release pressure and remove the two temporary bolts used during shipping. Next, screw the two cleaning handles into the top of the SkyHydrant making sure they are firmly seated into position.

Attach Legs and/or Wall Brackets

Use fasteners provided to screw the legs onto the base of the unit and/or attach the wall mounting brackets to the back of the SkyHydrant which in turn can be secured to a wall or upright (see Fittings & Accessory Sheet for details).

Connect Plumbing Fittings

All outlets use 20mm (3/4") BSP connectors and quick connect fittings. The taps numbers T1 "Dirty Water In" and T2 "Backwash Out" can be folded down level for use.

Setup Ancillary Connections

Connect hoses and fittings to allow the SkyHydrant to function i.e. Taps, pipes, tanks, pumps or other equipment (see How the Ultrafiltration Unit Works for details).

- Connect "dirty water in" hose to T1 "Dirty Wash In".
- Connect "backwash out" hose to T2 "Backwash Out".
- Connect drinking water "clean water out" hose to T3 "Clean Water Out".

COMMENCE USING THE SKYHYDRANT

Before start up, read section *"Water Pipes and Containers - Keep Free Of Contamination".*

1. **Fill the Unit with Water**
   Open T1 "Dirty Water In" and T4 "Vent". Wait until water flushes out T4 and Close T4 "Vent".
2. **Removing Trapped Air**
   Rotate cleaning handles anticlockwise until water leaks from the head. This releases any trapped air, gently turn the cleaning handles clockwise with just enough pressure to reseal the "O" rings (do not over tighten).
3. **Produce Drinking Water**
   Open T3 "Clean Water Out" to commence the flow of drinking water.

INTERNAL FILTER MODULE

The SkyHydrant does not need to be opened or accessed internally for cleaning or maintenance.

Regular cleaning is however essential to prevent the filter module becoming clogged. This is undertaken by moving handles on the top of the SkyHydrant back and forth as part of the cleaning process which only takes a couple of minutes to complete.

The SkyHydrant should function for many years without replacement of the internal filter module providing correct maintenance is undertaken. Also raw water entering the unit should be pre-filtered to remove suspended solid material and be free of any damaging chemicals.

Note: Water pipes and equipment should be flushed with a chlorine solution before use to eliminate contamination.

SKYHYDRANT MANUAL CLEANING

(UNDERTAKE DAILY OR MORE OFTEN IF NEEDED)

Mechanical cleaning of the SkyHydrant is essential to remove day-to-day accumulations of contaminate.

Do this by moving the cleaning handles on top of the unit back & forth at least daily and throughout the day. This is necessary to maintain the correct flow of drinking water and prevent the filtration module from clogging. Follow the process below:

M1 **Close all valves T1,2,3,4,5**. At this time the ultrafiltration unit should be full of water.

M2 Rotate the Cleaning Handle about 3 turns anti-clockwise to release the internal "O" rings seals. The handles should now move freely back & forth.

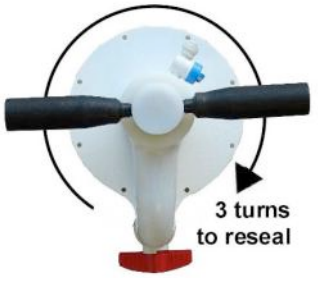
M3 Agitate the Cleaning Handles quickly back and forth (90° rotation) for about 1 minute. This movement cleans the filter module inside the unit.

M4 Open **T4 VENT** and **T2 BACKWASH OUT** and continue moving the cleaning handles back and forth until the unit drains of water Close **T2 BACKWASH OUT.**

M5 Open **T1 DIRTY WATER IN** and allow the unit to fill with water and flush through **T4 VENT.** Continue moving the cleaning handles back and forth.

Continue this action until water flushing from **T4 VENT** is the same colour as water entering through **T1 DIRTY WATER IN** (generally about 1 minute).

When complete, cease moving handles and close **T4 VENT.**



M6 Rotate the Cleaning Handles about three turns clockwise to gently reseal the "O" rings. Use just enough pressure to seal until water stops dripping. Do not over-tighten as this may strip the internal thread.

M7 The Manual Cleaning Procedure is now complete. Open **T3 CLEAN WATER OUT** to resume the flow of drinking water.

SKYHYDRANT SOLUTION CLEANING PROCEDURE

(Undertake weekly/monthly)

Solution cleaning removes accumulated organic matter and other contaminates from the SkyHydrant not removed by the regular manual cleaning. To do this, follow the process below:

Chlorine is used to remove deposits of organic matter form inside the filtration unit.
Follow steps C1 to C8 below and see step C4 for the amount of chlorine to use:

C1 Undertake Steps M1 to M6 of the MANUAL CLEAN PROCEDURE (listed on previous page)

C2 REPEAT Step M4 of the MANUAL CLEAN PROCEDURE (this will leave the unit empty of water).

C3 Fill the Solution Tank with water (3/4 full).

C4 Add chlorine (see amount below) to the solution tank and stir until dissolved. This should create a 0.2% chlorine solution inside the filter housing. The chlorine manufacturer will state the chlorine concentration on the label, this will determine how much chlorine to add using the information below.

CHLORINE	MAX SH1200	GEM SH600
	teaspoons	*teaspoons*
Chlorine powder with 65% available chlorine (700g/kg of chlorine)	4	2
Chlorine powder with 55% available chlorine (550g/kg of chlorine)	6	3
Chlorine powder with 35% available chlorine (350g/kg of chlorine)	8	4
Chlorine powder with 25% available chlorine (250g/kg of chlorine)	10	5
Liquid chlorine (Sodium Hypochlorite) with 12% available chlorine	200 ml	100 ml

C5 Open tap **T5 SOLUTION** and allow the solution tank to drain, close tap **T5-SOLUTION**.

C6 Open taps **T1 DIRTY WATER IN & T4 VENT** and allow the unit to fill with water and immediately close **T4 VENT** when water spills out.

C7 Rotate the Cleaning Handles about 3 turns anti-clockwise to unseal the internal "O" rings then move the Cleaning Handles quickly back and forth a few times, this mixes the chlorine inside the unit. A small amount of chlorine solution should also discharge from the top. Close **T1 DIRTY WATER IN** and leave to **soak for 4 hours or longer**

C8 After soaking carry out **Manual Clean**, follow Steps **M1 to M8**. After completion the unit can be returned back to producing drinking water again.

Solution Cleaning Using Citric Acid – *Undertake Monthly*

Citric acid is used to remove iron and manganese deposits from inside the filtration unit.

STEP 1 Complete a SOLUTION CLEAN USING CHLORINE (as above) followed by step M4 of the MANUAL CLEAN procedure (to make sure the unit is empty of water).

STEP 2 Undertake steps C3 and C4 (as above) and follow the table below for the amount of Citric Acid powder to add to the chemical tank in step C4 (instead of chlorine).

CITRIC ACID SOLUTION	MAX SH1200	GEM SH600
Fine Granular Citric Acid	500 gms	250 gms

STEP 3 Complete steps C5 to C8 (as above), however in step C4 leave the citric acid to soak for 12 hours (not 4 hours). This procedure is now complete.

Safe Use of Chemicals:

Follow manufacturer's safety instructions. Avoid contact with skin and wear protective gloves, eyeglasses and clothing. Do not inhale fumes.

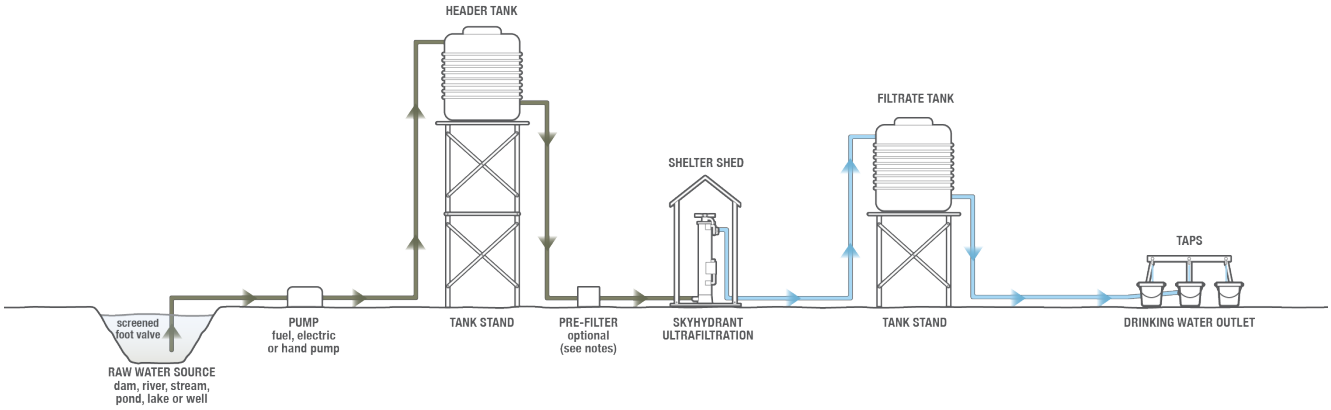
HOW THE SKYHYDRANT WORKS

The SkyHydrant requires no power to operate; instead it relies on the flow of water from gravity pressure. Raw water flows through the unit with a water head pressure of between 2 metres and maximum 4 metres (20kPa to 40kPa or 3psi to 6psi).

The SkyHydrant can be set up in a number of different ways to best accommodate site needs. A popular method is to pump raw water (using mechanical or hand pump) to a 1,000 litre header tank located on a 3 meter high tank-stand and allow the water to gravity feed through the ultrafiltration unit and collect in a 1,000 litre drinking water tank located on a 1 meter high tank stand.

The drinking tank can be connected with taps or be fitted with pipes for supplying water directly to houses through a distribution network.

Never pump or connect mains water pressure directly to the ultrafiltration unit without using a suitable water pressure regulating or control device as excessive water pressure may damage the filter fibres.



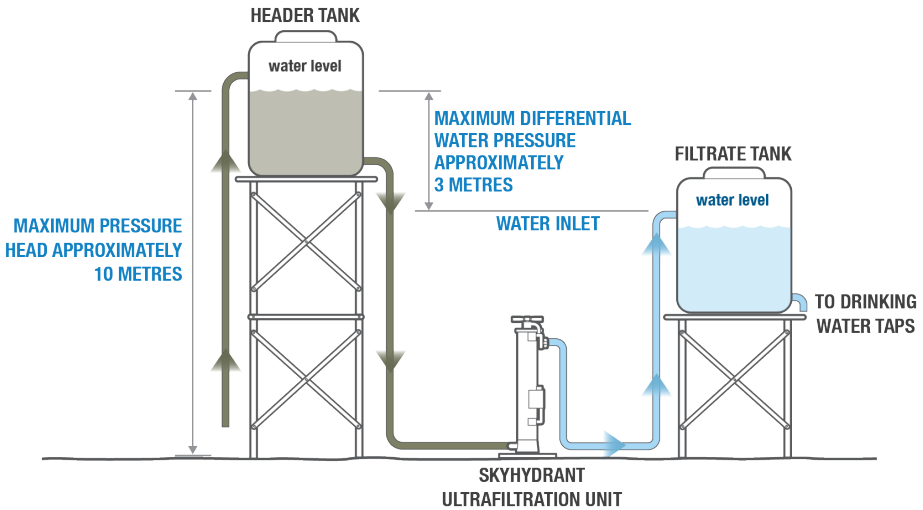
SKYHYDRANT SITE EQUIPMENT

For the SkyHydrant to function it requires additional operating equipment. This may include hoses, pipes, pumps, taps, tap stands, float valves, water bladders, tanks and tank stands.

The amount of additional equipment depends on the installation being undertaken and individual sites requirements.

Installations where existing roof top water tanks are available allows the ultrafiltration unit to become an “in line filter”. Simply connect to the existing water supply system. Other types of installations will require more extensive site work and equipment.

It is important when setting up the ultrafiltration unit to ensure correct sizing of pipes, pumps and other equipment.

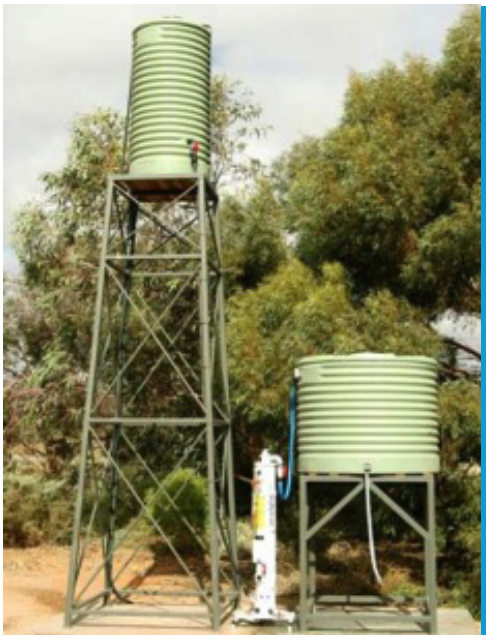


MULTIPLE SKYHYDRANT UNITS

Multiple SkyHydrant can be connected together (2 or more) to increase water production when required.

Multiple connection kits are available or alternatively obtain local plumbing fittings to manifold multiple SkyHydrants together.

Water production will vary significantly depending on the quality of the raw water available. Turbid and highly contaminated water will reduce output as well as increasing the frequency needed of cleaning cycles.



SKYHYDRANT UNIT SETUP

The SkyHydrant can be set up to operate as single stand-alone unit (picture to the left) or manifolded together into multiple units for high flow production (above).

The supply of raw water to SkyHydrant can be sourced from gravity feed overhead tanks or by using pressure reducing devices when supplied directly from pumps or pressure supply pipes.

Operating pressure should be limited to (20kPa to 40kPa or 3psi to 6psi) or about 2 to 4 meters head pressure to produce a typical flow rate of about 500 to 700 litres per hour per unit.

Drinking water produced from the SkyHydrant can be stored in tanks and connected to taps or be piped to household supplies.

PERFORMANCE MONITORING

At start up it is recommended the flow rate of the SkyHydrant be measured and recorded. This will determine if the flow rate decreases in the future.

To undertake this procedure, allow water to flow into T1 (dirty water in) from a measured height (say 2 metres) and use a stopwatch to time how long it takes to fill a measured bucket of water (say 10 litres) out of T3 (clean water out).

On a regular basis repeat this procedure. If the flow rate decreases it may indicate more frequent cleaning of the ultrafiltration unit be undertaken.

Over the lifetime of the ultrafiltration unit there will be a natural loss of flow due to ageing of the filter fibres.

OPERATION LOG SHEETS

It is good practice to keep a daily operational log-sheet (see Log Sheet on the last page) to record drinking water production flow rates and when cleaning procedures were undertaken.

This is useful to identify a pattern of use when monitoring on-going performance trends or to determine if operational problems may be occurring. It is also useful as a convenient reminder of when the next cleaning cycle is due to be undertaken, particularly when a cleaning roster is being used.

HOW TO MAINTAIN WATER QUALITY

FEED WATER SUITABILITY FOR ULTRAFILTRATION

Not all water is suitable for filtering through the SkyHydrant ultrafiltration unit (UF) and testing for unsuitable contaminates should be undertaken before use.

- **YES – Diseases Removed**
  The SkyHydrant will significantly remove biological contaminates and pathogens including bacteria, viruses, protozoa, cysts, parasites etc. making water safe to drink.

- **YES – Turbidity Removed**
  The SkyHydrant will remove turbidity and dirt from water. Dirty water can however damage the filter fibres and it is recommended to install a pre-filter.

- **NO – Chemicals NOT Removed**
  The SkyHydrant will not remove salt or dissolved chemicals and minerals from water.

WATER PIPES AND CONTAINERS KEEP FREE OF CONTAMINATION

Use a chlorine solution to sanitise and eliminate any residual post contamination, which may spread disease in water pipes, drinking containers, hoses, taps, and other equipment.

Use a 0.1% (1,000 parts per million) chlorine solution (add approximately 1 teaspoon of chlorine powder to 5 litres of water) and flush through pipes or wash drinking water containers.

It is also recommended to regularly flush a chlorinated solution through the SkyHydrant together with drinking water hoses and pipes to eliminate any post contamination.

PRE-FILTRATION TREATMENT

It is recommended that a pre-filter be installed to reduce solids from fouling the internal filter module when using a highly turbid water source.

A pre-filter (300-micron) will provide good protection, pre-filters will also require regular cleaning to maintain a good water flow.

SKYHYDRANT LONG TERM STORAGE

When the SkyHydrant is placed into storage for use again in the future, the filter fibres must remain wet at all time to prevent permanent damage.

When placing the ultrafiltration unit into storage:
- Undertake a chemical clean and leave at least 1 litre of clean water inside the unit (or preferably leave the unit full of clean water with 5 to 10ppm chlorine) to maintain a wet environment.
- Turn all valves off before placing the unit into storage. Do not store in conditions below freezing.

After storage undertake a chemical clean to restore the filter module back to normal operation condition.

PREVENTING POST CONTAMINATION OF DRINKING WATER

Water produced from the SkyHydrant is free of biological contaminates and safe to drink. Over time however, water quality can deteriorate - in hot climates water can remain safe for a few days while in colder climates it may stay safe for weeks.

To maintain water quality it is good practice to regularly disinfect drinking water tanks and water pipes by adding a small amount of chlorine to prevent the growth of unwanted organisms and pathogens in the stored water.

To achieve this, as a guide add about 3/4 teaspoon of chlorine powder (at 65% available chlorine) or 1½ teaspoons of chlorine powder (at 35% available chlorine) for every 1,000-litres of tank water. First, mix the chlorine in a small bucket of water to make a solution before adding the chlorine solution to the tank.

It is recommended to use a water testing kit to maintain a free residual chlorine level of between 0.2 to 0.5 milligrams per litre (mg/l) which is equivalent to 2 to 5 parts per million (PPM). Water should be tested every few days to maintain the chlorine levels and make adjustments as necessary.

ULTRAFILTATION REMOVAL CRITERIA

A patented low-pressure ultrafiltration technology meeting and exceeding World Health Organisation requirements for safe drinking water.

Proprietary and patented low-pressure ultrafiltration membrane technology is highly effective in removing all non-dissolved species in feed waters. Ultrafiltration is classified by the World Health Organisation (WHO) as effective removal of disease causing pathogens and exceeds requirements for key criteria to produce safe drinking water. However, it is important to test the water and validate the composition of the feed water. Please refer to the Technical Bulletins and Specifications to obtain specific information on performance.

Ultrafiltration (to 0.04um nominal) *WILL REMOVE* Pathogens (disease causing organisms) and Turbidity (dirt):

1. **PATHOGENS removed (to log reduction value >4) by ultrafiltration include:**
   - Bacteria
   - Protozoa
   - Cysts
   - Helminths
   - Total Coliform TC
   - Total Coliform FC
   - Ecoli
   - Virus (significantly reduces virus levels)

2. **TURBIDITY**
   NTU (Nephelometric Turbidity Units) is removed by ultra-filtration to levels below <0.1 NTU. Turbid water contains suspended matter such as clay, slit, fine fragments of organic matter, and similar material. TURBIDITY levels of up to 1000 NTU can be removed however levels below 500 NTU are preferred.

3. **TOTAL SUSPENDED SOLIDS (TSS) will be removed. TSS is similar to turbidity.**
4. **IRON AND MANGANESE if first oxidised or if colloidal can be removed by ultrafiltration.**
5. **ARSENIC MANGANESE if first oxidised can be removed by ultra iltration.**

The World Health Organisation (WHO) reports that ultrafiltration provides complete removal of bacteria and viruses (disease causing pathogens) as outlined in WHO document "GUIDELINES FOR DRINKG WATER QUALITY" under "Treatment Process" as referenced in the WHO website.

Ultrafiltration (to 0.04um nominal) *WILL NOT REMOVE* Chemicals or Minerals or Salinity (salt) from water:

Note: mg/L (milligrams per litre) also equals ppm (parts per million); WHO (World Health Organisation)

1. **Chemicals not removed by ultrafiltration include:**
   - Arsenic (unless first oxidised) (WHO safe drinking standard - Max 0.01 mg/L)
   - Cadmium (WHO safe drinking standard - Max 0.003 mg/L)
   - Chromium (WHO safe drinking standard - Max 0.05 mg/L)
   - Copper (WHO safe drinking standard - Max 2.0 mg/L)
   - Cyanide (WHO safe drinking standard - Max 0.07 mg/L)
   - Fluoride (WHO safe drinking standard - 1.5 mg/L)
   - Lead (WHO safe drinking standard - Max 0.01 mg/L)
   - Mercury (WHO safe drinking standard - Max 0.006 mg/L)
   - Nickel (WHO safe drinking standard - Max 0.07 mg/L)
   - Nitrate (WHO safe drinking standard - Max 50 ml/L as NO3)
   - Nitrite (WHO safe drinking standard - 3 mg/L as NO2)
   - Sulphate (Safe Drinking Levels: 250 mg/L but up to 500mg/L can be tolerated

2. **Minerals (hardness) is not removed by ultrafiltration, this includes:**

- Total Hardness, hard water is mainly calcium and magnesium and is not considered a health risk but can be unpleasant to taste and cause a build up of scale in pipes (WHO safe drinking standard-Max 500 mg/L)
- Calcium, Carbonate (WHO safe drinking standard- Max 250 mg/L)
- Iron and Manganese (unless first oxidised) (WHO safe drinking standard- 0.4 mg/L; Note: exceeding this level is not unsafe but is unpleasant to taste - max 1.0 mg/L)
- Magnesium (WHO safe drinking standard- Max 150 mg/L)

3. **Salinity and salts are not removed by ultrafiltration include:**
   - Salinity (WHO safe drinking standard - Max 250 mg/L)
   - Chloride and Sodium (WHO safe drinking standard - Max 600 mg/L)
   - Conductivity (WHO safe drinking standard - Max 2000 uS/cm)

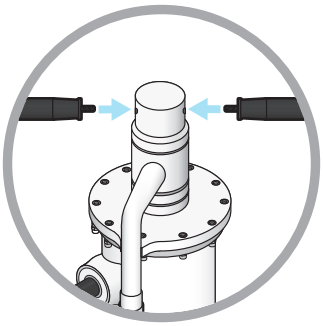
4. **Total dissolved solids (TDS) cannot be successfully removed by ultrafiltration:**
   - TDS (WHO safe drinking standard - Max 1000 mg/L)
   - TDS contain a wide range of substances including organic and inorganic (chemicals)

5. **Unpleasant tastes are not successfully removed in most cases using ultrafiltration.**

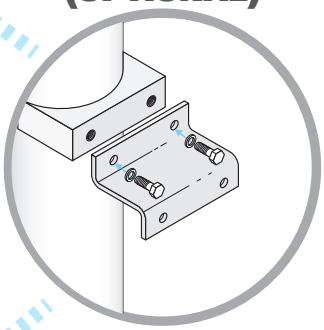
Ultrafiltration will have NO effect on ph levels:

- *pH Scale (WHO safe drinking standard 6.5 – 9.0)*
- *Total Alkalinity (WHO safe drinking standard max 500)*
- *pH levels are not considered a health issue but may cause corrosion or encrustation of plumbing fittings and pipes.*

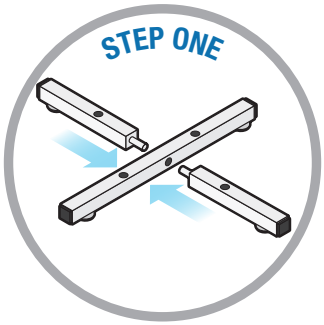
CONNECT HANDLES

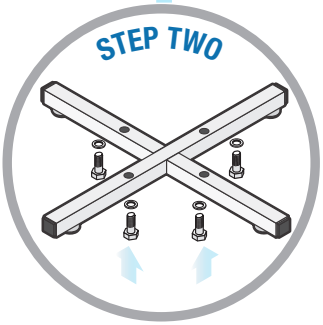


CONNECT WALL BRACKETS (OPTIONAL)



CONNECT LEGS





DATA SHEET

SkyHydrant Water Filtration Units require no power or replacement filters and can be operated by non-technical persons. SkyHydrants are lightweight and portable making them ideal for supplying drinking water in most remote locations from both surface and ground water supplies.

They can operate as single standalone units or be manifolded together to increase water flow to create large-scale water production plants.

SkyHydrants will significantly remove pathogens from feed water including bacteria, viruses, protozoa, cysts and parasites to a level as classified by the World Health Organisation (WHO) as suitable for drinking water.

Turbidity will also be removed and as turbidity rise the SkyHydrants will require more frequent cleaning cycles to remove accumulated contaminates. A pre-filter to 200 microns is highly recommended to reduce module fouling in areas where high levels of solids are found.

The backwash cleaning cycle is easily undertaken requiring no tools or the need to access internal components of the SkyHydrant. Handles on top of the unit are simply moved back and forth for the mechanical agitation cleaning process which takes about one minute to complete before the back flush valve is opened to release contaminates.

BACKGROUND

Small communities require robust, reliable water treatment solutions often from difficult water sources. The treatment systems must provide pathogen free water economically and with minimal operator attendance.

TYPICAL APPLICATIONS

- Decentralised water treatment systems
- Community small-scale systems
- Remote and rural
- Communities
- Point-of-entry filtration
- Emergency and temporary water supplies
- RO (reverse osmosis) pre-treatment

THE SOLUTION

The SkyHydrant is a patented low cost, low maintenance ultra water filtration solution.

It affords practical, small-scale potable water treatment using proven ultrafiltration (UF) membrane technology.

The hollow fibre membrane filtration module is mounted inside a potable rated moulded plastic pressure housing which is compact, robust, easy to transport and simple to install.

The UF barrier filtration process provides primary disinfection by removing pathogens and particulates to supply safe drinking water from the majority of non-saline surface and ground waters.

Additional post filtration treatment including ultra violet (UV) or chlorine disinfection can be utilised if desired.

OPERATING DESCRIPTION

Raw water flows into the SkyHydrant housing under low pressure. As it passes through the porous walls of the hollow fibre membranes inside the unit, solids are retained on the membrane surface. The SkyHydrant is suitable for use in either pumped feed or gravity feed applications.

The secret to the successful operation of the SkyHydrant is the effectiveness of its patented backwash system, which uses a mechanical agitation process to clean membrane surfaces.

Backwashing is initiated manually by an operator, on a frequency as determined by site conditions and at least once a day.

Periodically the SkyHydrant also requires a chemical clean to remove residual fouling that cannot be removed by the daily backwash process alone and helps to limit biological growth in the system.

Typically chlorine and occasionally citric acid is used for the chemical cleaning process, which requires an operator to attend. Chemical cleaning frequency is application specific but generally between weekly and monthly.

MEMCOR® MEMBRANE MODULES

The membrane filtration modules use high permeability, low fouling PVDF hollow fibre membranes for optimum performance and long life. The modules are simple in design and easy to install and maintain.

MEMBRANE CLEANING

A simple low pressure patented mechanically agitated backwash sequence together with periodic chemical cleaning for quality performance at low differential pressure, even with turbid feed waters.

Note: Design, data and dimensions are subject to modification without notice.

TECHNICAL DATA

Typical Application	Filtration of potable non-saline surface water or groundwater for small communities. Not suitable for use with seawater or brackish water or other water sources containing contaminants such as heavy metals.

Typical filtrate production capacity treating clear surface water[1]

Model Number	**Nominal litres per day using low turbidity feed water**
SkyHydrant **MAX** (SH1200)	Nominal 12,000 litres per day
SkyHydrant **GEM** (SH600)	Nominal 6,000 litres per day

Typical Feed Inlet Pressure Range for Gravity Feed	3 metres to 4 metres head pressure
Maximum Housing Operating Pressure	100kPa
Membrane Module Details	MEMCOR® membrane filtration module polyvinylidene fluoride (PVDF) hollow fibre ultrafiltration membrane with nominal pore size 0.04µm. Filter direction outside to inside.
Materials of Construction:	
Module Housing Assembly	Food grade polyethylene (PE)
Valves	Various including PVC and PP
Seals and Gaskets	EPDM typical
Pipe and Fittings	Various including PE, ABS, Nylon and PVC
"Filter" Mode Operation	Pressurised outside to inside filtration
Feed Pre-Screen Mesh Size Recommended	500µm or finer
Max. Recommended Feed Turbidity	50 NTU
Filtered Water Turbidity	< 0.1 NTU
Typical Log Reduction Value	> 4 LRV (for particles 2 to 5µm)
Operating Feed Temperature Range	> 0 to 35˚C (> 32 to 95ºF)
Temperature Range for Tansportation and Storage	> 0 to 35˚C (> 32 to 95ºF) Note: The unit must not be allowed to freeze
Feed pH Range	6.0 to 9.0pH Note: Exposure to chlorine or chloramines is not recommended in feeds below 6.5pH
Allowable pH Range for Cleaning	2 to 10pH typical Note: Occasional brief exposure during chlorine cleans to 10.5pH is acceptable
Waste Water Volume Per Backwash	Approximately 15 litres Gravity drain waste outlet to be provided adjacent to unit
Backwash	Mechanical Agitation
Typical Target Chlorine Concentration During a Chlorine Clean	300 to 500mg/L / 300 to 500ppm
Cleaning Concentrate and Volume Required for an Acid Cleaning Cycle	Typically about 300 grams of citric acid powder will be used
Typical Target Acid Concentration During an Acid Clean	2.0 to 2.2pH (not less than 2.0pH)
Electricity Supply	Not Required
Recommended Installation Location	Installed under cover with protection from direct sunlight and rainfall

[1] *Feed water quality will affect production capacity.*
[2] *Unscreened or coarsely screened raw water may reduce membrane operating life.*
[3] *Capacity and backwashing/cleaning frequency will typically vary with feed turbidity.*

WEIGHT & DIMENSIONS

UNIT DIMENSIONS & MASS (Approximate)

Model Number	Height (cm)	Depth (cm)	Width (cm)	Mass (kg-dry)	Mass (kg-wet)
SkyHydrant**MAX** (SH1200)	143	18	25	13	32
SkyHydrant**GEM** (SH600)	82	18	25	9	21

SHIPPING DIMENSIONS & MASS (Approximate – Shrink Wrapped

Model Number	Height (cm)	Depth (cm)	Width (cm)	Mass(kg-dry)
SkyHydrant**MAX** (SH1200)	150	20	28	18
SkyHydrant**GEM** (SH600)	90	20	28	12

FILTRATE QUALITY

Parameter	Log Reduction Value	
Bacteria	>6	99.9999%
Virus	>3	99.9%
Coliform	>6	99.9999%
Cryptosporidium	>6	99.9999%

Parameter	Log Reduction Value	
Giardia	>6	99.9999%
Algae	>6	99.9999%
Turbidity	<0.02	

TERMINOLOGY

Ppm	=	Parts per Million
NTU	=	Nephelometric Turbidity Units (a measurement of turbidity)
Um	=	Micron
M	=	Metre

IMPORTANT OPERATING INFORMATION

- The filter sub-modules located inside the SkyHydrant is to remain in a wet environment to avoid the membrane drying which would result in total and permanent loss of performance. If long-term storage is necessary after operation, the unit is to be rinsed with a solution of sodium hypochlorite (100ppm) and stored at a temperature not above 40˚C, out of direct sunlight.

- When SkyHydrants are being used for the first time it is recommended that a chlorinated backwash be carried out before the filtrate is used.

- The filter sub-module is resistant to oxidising agents such as chlorine, chloramines, bromine, bromamine, and potassium permanganate. Maximum exposure of sub-modules to bromine, bromamine, potassium permanganate, and other oxidants should be checked prior to starting operation.

- The SkyHydrant comprises a single MEMCOR® membrane sub-module located inside in a low-pressure housing. The unit is suitable for operation under low positive or negative head pressure. Raw water flows along the length of the hollow fibres before being forced through the walls of the fibre to produce a filtrate virtually free of suspended solids. The unit removes virtually all solids and bacteria and significantly reduces virus levels. Filtrate flow rate is controlled manually.

OPERATING LOG

TIME	DATE	DRINKING WATER PRODUCTION (L)	MANUAL CLEANING UNDERTAKEN	CHEMICAL CLEANING UNDERTAKEN	AMOUNT CHLORINE USED	OTHER INFORMATION OR NOTES

Safe Water for Every Child

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