

HYDROFILL

Personal Hydrogen Station

Frequently Asked Questions (FAQ)

SPECIFICATIONS

Stack type	Proton exchange membrane electrolysis cell
Dimensions (W x D x H)	145 x 153 x 208 mm (5.7 x 6 x 8.2 in)
Weight	1.8Kg ±5% (3.97Lbs ±5%)
Rated power	≤30W
Input voltage	DC: 11V-19V
Water input	De-ionized or distilled water
Water temperature	10-40°C (50-104°F)
Water consumption	Approx. 20ml/hr (1.2in ³ /hr)
Hydrogen output pressure	0-3.3 MPaG (0-478.62 PSI)
Hydrogen generation capacity	Up to 3L/hr (0-183 in ³ /hr)
Purity	99.6% (designed for HYDROSTIK only)
Outlet specification	Designed for HYDROSTIK only
Refilling time for one HYDROSTIK	Around 4 hours (at 25C ambient temperature)

The specifications are subject to change without notice.

Q: How does it work?

A: Hydrogen is stored as a solid hydride in small cartridges (HYDROSTIK). When using the HYDROFILL device, hydrogen gas is sent at high pressure into the cartridge and the gas is adsorbed onto the surface area of a special alloy metal contained inside the cartridge - becoming a solid metal hydride and releasing heat. When connected to the fuel cell, the cartridge slowly releases hydrogen by absorbing heat from the ambient air and cools the cartridge. This is the safest form of hydrogen storage since hydrogen is not stored at high pressure as a gas.

Q: How do I refill HYDROSTIK with hydrogen?

A: All you need to do is add de-ionized or distilled water into the tank; connect the AC-DC adaptor (or follow the instructions on how to integrate small solar PV panels or wind turbines to the DC input) and then connect an empty HYDROSTIK cartridge to the HYDROFILL cartridge port. Once activated, the HYDROFILL will separate oxygen and hydrogen from water, sending hydrogen into your HYDROSTIK cartridge. Oxygen is vented to the ambient air. (for details please refer to the operation instructions).

Q: Can I refill other cartridges not provided by Horizon?

A: No, HYDROFILL is designed to refill only the HYDROSTIK canister provided by Horizon.

Q: Is the HYDROFILL safe to use?

A: Yes. The HYDROFILL system uses a proton exchange membrane (PEM) electrolyzer-based system to separate hydrogen and oxygen from water and stores hydrogen in a safe, solid form using special metal alloys contained in the HYDROSTIK cartridges. HYDROSTIK fuel cartridges for micro-fuel cell systems such as the MINIPAK are designed to safely contain fuel for a portable consumer product. Each HYDROSTIK stores about 10 L of hydrogen as part of a solid metal complex and with very little pressure.

Q: How long it will take to fully charge a canister?

A: It will take around 4 hours to fully charge a cartridge under room temperature conditions.

Q: How do I know a canister is fully charged or empty?

A: If a cartridge is connected to the HYDROFILL and the status indicator light on the HYDROFILL turns green, this means the HYDROSTIK cartridge is fully charged. Alternatively, it is possible to weigh the canister before and after filling. A filled canister will weigh 0.9 grams more than an empty one.

Q: What is the purity level of the hydrogen produced by the HYDROFILL?

A: The purity of hydrogen produced by the HYDROFILL is 99.6% at room temperature. The metal hydrides contained in the cartridges first adsorb hydrogen, then release it at a high purity (99.9%) into the fuel cell.

Q: Is the HYDROFILL certified for commercial sales?

A: Yes. The HYDROFILL is CE certified by Notified Body 1128.

Q: What happens if the canister is fully charged, but still connected to the HYDROFILL?

A: The system will stop operation automatically once the canister is fully charged.

Q: What happens if the canister is disconnected while the power supply is still connected?

A: The system will stop operation automatically once the canister is disconnected.

Q: How do I get out of safety shut-off mode?

A: Simply reset/restart the HYDROFILL by unplugging it from the power source and plugging it back in again.

Q: What is the maximum current rating of the HYDROFILL?

A: Max. 2.5 Amps at 12 V.

Q: What is the maximum power input for the HYDROFILL?

A: The HYDROFILL consumes max. 30 W of power; however, solar panels or generators with higher power ratings can still operate the HYDROFILL as long as the input voltage stays between 11V to 19 V.

Q: Is it possible to produce renewable hydrogen fuel using solar or wind power?

A: Yes. Please follow the HYDROFILL operation instructions to produce renewable hydrogen fuel using solar or wind power.

Q: Can solar or wind power be directly connected to the HYDROFILL?

A: No. A “deep-cycle” 11-14.4 V / 5Ah battery in between the solar panel or wind power and HYDROFILL **shall be** used to maintain a steady voltage. Not using one will decrease the lifetime of the HYDROFILL and HYDROSTIK. Deep-cycle batteries are ideal for solar or wind applications where the sun or wind may be gone for long periods of time and may be need to be fully depleted often.

Q: What type of battery is a “deep-cycle” battery?

A: There are several types of deep-cycle batteries, the main distinguishing factor is the ability to be almost completely discharged (deeply discharged) and charged back up again to full capacity without noticeably affecting the battery’s lifetime. Some deep-cycle battery types are absorbed glass mat (AGM) lead acid, gel cell lead acid, Lithium ion, Lithium Iron-Phosphate, Nickel Metal Hydride and/or Nickel Cadmium. Out of these, AGM batteries are the most cost effective.

Q: Do I need a charge controller to run with the HYDROFILL?

A: Yes. A charge controller shall be used simply because it expands the capability of the solar array chosen. When a solar cell is connected to a charge controller a benefit of a charge controller is that it allows for the solar panel to safely charge a 11V-14.4 V / 5Ah battery which can then power the HYDROFILL when the sun is down, the sky is cloudy, or the solar panel is not connected.

Q: What happens if a really large voltage is applied to the HYDROFILL?

A: The HYDROFILL components are sensitive and will be destroyed if too much voltage is applied which is why the HYDROFILL has a safety shut-off mechanism.

Q: What is the maximum short circuit current the HYDROFILL can handle?

A: The HYDROFILL internally regulates the current to 7A with a current regulator, so a large short-circuit current solar panel isn't a problem for the HYDROFILL.

Q: When do I need to add water to the water tank?

A: The status indicator light is flashing red for one-second intervals. Slowly and carefully fill de-ionized or distilled water into the water tank until water reaches the ridge level in the tank (for details please refer to the operation instructions).

Q: When should I empty the drainage tank?

A: When the waste tank is full, pour wastewater out and refill the water tank.

Q: Should I empty the water tank after use?

A: Not necessarily. De-ionized or distilled water in the water tank can remain inside after use.

Q: What is the bag containing powder that is included with the HYDROFILL?

A: The powder contained inside the maintenance kit bag is malic acid used in food additives. Metal ions will strongly affect and poison the electrolyzer stack inside the HYDROFILL over time. Many acidic solutions have the ability to neutralize the ions and help recover the performance of the HYDROFILL. Malic acid or in this case apple acid, a food additive, is very safe and can be used for system maintenance with no negative effect. Keep away from children and do not consume.

Q: How do I use the maintenance kit?

A: If the red status indicator light alternates between red for 1 second and off for 3 seconds, carefully add the entire contents of one maintenance kit bag into the water tank without disconnecting the cartridge. Allow the HYDROFILL to charge the HYDROSTIK cartridge for more than 1 hour. This procedure will help improve the performance of the HYDROFILL.

Q: The status indicator light on HYDROFILL does not turn red after the HYDROSTIK is connected

A: Disconnect the HYDROSTIK and then connect it again slowly. Make sure the connection is smooth and check the water level.

Q: The status indicator light does not turn on red after the HYDROSTIK is connected to the HYDROFILL.

A: Disconnect the HYDROSTIK and then connect it again slowly. Make sure the connection is smooth and check the water level.

Q: The cartridge is already charged for more than 6 hours, but the status indicator light is still red.

A: Connect the cartridge tightly and correctly. If the problem continues, contact: support@horizonfuelcell.com.

Q: How to store HYDROFILL?

A: Keep HYDROFILL at near room temperature (20-30 °C). Keep HYDROFILL and HYDROSTIK cartridge away from fire, open flame, or heat source. Keep all electrical connections dry at all times. Keep HYDROFILL away from dust.