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H2HUBB Official Test Report

Evaluation Introduction

Our report summarizes our analysis of the Hydrogenator® Hydrogen Water Bottle offered by the company Piurify. H2HUBB classifies this device as a high-pressure (psi) H2 water portable system. The device features a PEM/SPE membrane to ensure H2 gas production regardless of source water conductivity (TDS). Its session time-frame or cycle time-frames are 5 minutes and 10 minutes. We evaluated the system's dissolved hydrogen performance at 5-10 minutes. The unit contains a 3.7 V +1800 mAh battery, as stated by the battery specs. Our investigation was to analyze whether the product would meet our H2 product performance standards, which must be achieved to be approved and recommended by H2HUBB. To learn more about our H2 performance standards for hydrogen water bottles, visit [H2HUBB](https://www.h2hubb.com).

H2 Products

- Company: Piurify
- Product Name: Hydrogenator® Bottle
- Type: High-Concentration H2 Water Device
 - PEM/SPE
 - Portable hydrogen water generator
 - High-PSI bottle
- URL Link: <https://www.piurify.com/>

Method and Procedure

- Distilled water: 6.0 pH (verifies that unit can function with low water conductivity)
- ΔpH (delta pH): Did not increase
- Water Temperature: 65~70°F/ 18~21°C
- Bottle Vol Size: 0.280 L or 280 mL
- Cycle Time Frame:
 - 5-minutes
 - 10-minutes
- Contamination Tests:
 - Chlorine generation (Cl2)
 - Ozone Generation (O3)
- Test Location: 277 meters (909 ft elevation)
- Test Methodology:
 - Titration: H2Blue® Test Reagent
- All Dissolved H2 Concentration Tests Converted to SATP (water temp and pressure)
- Claimed Dissolved H2 mg/L: 1.6-3.0 mg/L (post 5~10 minutes)

Test Results

To measure the dissolved hydrogen gas concentration of the bottle, we filled it with distilled water up to the base of the threads. The lid was then securely fastened, and the bottle was activated using either the 5-minute or 10-minute hydrogen generation setting. All measurements were conducted using the H2Blue testing method. Multiple tests were performed to ensure accuracy, and the results were averaged to determine the bottle's performance. While our primary emphasis is on the average dissolved hydrogen concentration, peak concentration values are also included to provide a comprehensive analysis of the bottle's capabilities.

H2 Concentration at SATP:

- 5-mins avg mg/L (ppm): \cong 2.80 mg/L (ppm); SD: 0.02
- 10-mins avg mg/L (ppm): \cong 3.85 mg/L (ppm); SD: 0.16

Peak H2 Concentration at SATP:

- 5-mins peak mg/L (ppm): \cong 2.80 mg/L (ppm)
- 10-mins peak mg/L (ppm): \cong 4.03 mg/L (ppm)

Avg H2 mg Produced in Designated Vol:

- 5-mins: \cong 0.80 mg (\equiv 9.71 mL Dissolved)
- 10-mins: \cong 1.08 mg (\equiv 13.11 mL Dissolved)
- **Claimed H2 mg/L (ppm) confirmed:** Yes

H2HUBB Hydrogen Concentration Assessment

- According to our testing, the Hydrogenator® Hydrogen Water Bottle exhibits a dissolved molecular hydrogen concentration of 2.80 - 3.85 mg/L (ppm) throughout its cycle durations of 5 to 10 minutes. Based on current scientific literature in human studies, the dissolved hydrogen concentration on the 5-10 minute settings is deemed sufficient to induce therapeutic effects. The bottle surpasses our H2HUBB standards for both **H2 Concentration and Daily Dose of H2**, and we recommend users utilize the 10-minute cycle time for consuming hydrogen water from the device.

Contamination Test:

- Chlorine (Cl2): No detectable levels
- Ozone (O3): No detectable levels

Internal Performance

Manufacturer's Rated Electrical Values: (as stated on the power supply)

- **Type of device/electrolytic cell**
 - Pure H2: PEM/SPE membrane
- **Applied volts:**
 - 3.7 volts
- **Total Amps:**
 - 1800 mAh (1.8 amps)
- **Total watts:**
 - 6.66 Wh (watts)
- **Electrolysis volts:**
 - 2.35 volts
- **Electrolysis amps:**
 - 1.03 amps
- **Total watts:**
 - 2.42 watts

H2 Production vs. Dissolved Hydrogen:

- **Theoretical Max H2 production:**
 - 7.84 mL/min or 0.65 mg/min
- **Theoretical Max Dissolved H2 Level**
 - 5-mins: \cong 11.53 mg/L (ppm)
 - 10-mins: \cong 23.06 mg/L (ppm)
- **Measured Dissolved H2 reading:**
 - 5-mins: \cong 2.80 mg/L (ppm)
 - 10-mins: \cong 3.85 mg/L (ppm)
- **Percentage of Max H2 Dissolved (as measured):**
 - 5-mins: \cong 24.29% dissolved
 - 10-mins: \cong 16.70% dissolved
- **Percentage of Max H2 Undissolved (loss):**
 - 5-mins: \cong 75.71% undissolved
 - 10-mins: \cong 83.30% undissolved

Product Assessment

Functionality:

- Power on/off button
 - Located on the H2 generator.
 - Press the power button to initiate electrolysis for hydrogen gas production and initiate a 5-minute session, then shuts off.
 - Press the power button twice to initiate a 10-minute session time then shuts off.
- USB-C charging port
 - Located on the backside of the device.
- Anode reservoir off-gas port
 - Pin-hole located on the bottom of the bottle.

Reliability:

- New: Yes
 - Initial test results and evaluation are currently on the report. (see Overall Opinion)

Cost:

- Hydrogenator® Hydrogen Water Bottle: \$249.99 USD
- H2 Hubb discount: TBA
- H2 Hubb recommendation cost: TBA

Overall Opinion

The Hydrogenator® Hydrogen Water Bottle is a well-engineered portable hydrogen water unit. Our evaluation found that the device produced approximately 3.85 mg/L (ppm) of dissolved H2 in 280 mL of water during a 10-minute session, resulting in 1.08 mg of H2 (\cong 13.11 mL) dissolved in the bottle. The total mass of hydrogen gas (in milligrams) dissolved by the bottle within 10 minutes falls within the acceptable range for a portable H2 water generator (>0.4 mg). Additionally, the milligram dosage of H2 after the 10-minute cycle time exceeds H2HUBB's daily standard of 0.8 mg of H2 per day with just one bottle, putting it on par with some of the best-performing hydrogen water bottles we have tested and currently recommend.

Dissolved hydrogen concentration (mg/L (ppm)) is a critical performance metric, as research suggests that 1-3 mg of H2 or more per day appears to be therapeutic for humans. Furthermore, the **IHSA** standard for this type of product is a minimum of 0.5 mg/serving or 0.5 mg/L. H2HUBB's performance standard for hydrogen water devices is slightly higher than IHSA, as we require the device to provide a concentration of 0.8 mg/L (ppm) and 0.8 mg/day consistently. The Hydrogenator® Hydrogen Water Bottle surpassed H2HUBB standards for both **H2 Concentration and Daily Dose of H2**. Based on current research data, we believe the device's mg/L (ppm) performance provides adequate levels of hydrogen gas to induce therapeutic effects in humans. **According to our test results, the product will be featured on our website as a Level 3 hydrogen water device.** You can view the meaning of this rankings **here**. We are pleased with the device's dissolved hydrogen concentration.

The hydrogen water bottle comes with a nasal cannula for inhaling hydrogen gas. To determine whether Piurify actively promotes this feature, we reviewed their marketing materials and website. Our investigation revealed that Piurify actively promotes the inhalation of hydrogen gas from their hydrogen water bottle.

It is critical to clarify our position on this matter: hydrogen water bottles are not suitable for hydrogen inhalation. This stance is supported by both scientific evidence and our own testing. We strongly advise against using hydrogen water bottles for inhalation purposes, as their design, functionality, and hydrogen gas production capacity are not suitable for this application.

Our calculations show that, under ideal conditions with no H₂ losses, these hydrogen water bottles may produce an inhaled hydrogen concentration of only 0.1-0.2% in the nasal cavity. This concentration is already significantly below the therapeutic levels reported in scientific studies. However, when accounting for hydrogen loss during exhalation—approximately 66-67% due to the use of nasal cannulas—the actual administered H₂ concentration drops even further, to around 0.033%. This level is roughly 40 times lower than the minimum concentration required to achieve any therapeutic benefit based on the available data we have now.

Furthermore, additional factors such as the dissolution of hydrogen into the water and the time required to purge atmospheric air from an empty bottle or moisturizing plugs can further diminish the already low concentration of inhaled H₂. As a result, the final hydrogen concentration reaching the bloodstream or cells is approximately < 0.2 µmol/L, which is 30-50 times lower than the levels typically required to induce therapeutic effects in humans. Therefore, we strongly advise against using hydrogen water bottles for inhalation purposes, as they are insufficient for delivering the necessary hydrogen levels for systemic benefits. These bottles are best utilized for their intended purpose—drinking hydrogen water, which remains a far more effective method to derive therapeutic benefits from the bottle. The inhalation attachments for hydrogen water bottles are largely a marketing gimmick, capitalizing on the growing interest in hydrogen inhalation. Consumers would be better off not wasting their time or money on trying to breathe hydrogen gas from a hydrogen water bottle, as it is a pointless feature with regard to the current research.

The Piurify hydrogen water bottle includes a PPB display feature designed to estimate dissolved hydrogen concentration. At H2HUBB, we hold reservations about the inclusion of PPB or PPM displays in hydrogen water products due to the inherent inaccuracies of hydrogen prediction software. These systems are often unreliable and can mislead consumers regarding the actual hydrogen concentration in the water.

Our tests confirmed that the prediction software inaccurately estimates dissolved hydrogen levels under various cycle durations and water volumes. This inaccuracy stems from the software's reliance on extrapolated factors that fail to provide precise measurements of dissolved hydrogen gas. For such accuracy, hydrogen water bottles would require the integration of a true hydrogen probe—a technology that is both complex and prohibitively expensive for consumer products.

Given these findings, H2HUBB strongly recommends that Piurify inform consumers not to rely on the PPB display feature for determining hydrogen concentration. Instead, consumers should reference the independent test results conducted by H2HUBB LLC, H2 Analytics, or use reliable testing methods such as H2Blue. However, accurate use of H2Blue requires proper guidance from credible authorities in the field, such as H2HUBB LLC or H2 Analytics, to ensure accurate measurement of dissolved hydrogen gas.

The Hydrogenator® hydrogen water bottle is both visually appealing and thoughtfully engineered, utilizing high-quality materials to deliver consistent performance. It effectively dissolves therapeutic concentrations of hydrogen gas into its 280 mL capacity, meeting the needs of users seeking health benefits through hydrogen water.

Our evaluation confirms the manufacturer's claims regarding the bottle's hydrogen gas (H₂) performance, with test results aligning closely with the specifications outlined in the product's marketing materials. Furthermore, the device incorporates standard safety features, effectively preventing the production of chlorine and ozone in the drinking water. We observed no safety concerns during our testing.

Overall, we are pleased with the device's performance. The Hydrogenator® exceeded H2HUBB's minimum performance standards, and in our professional opinion, it is a reliable and safe choice for in-home hydrogen water therapy.

H2 Hubb LLC disclaimer: All tests conducted and test results produced by H2 Hubb LLC have been done according to industry-accepted practices and standards. Nevertheless, these results may not necessarily reflect test results performed by manufacturers, suppliers or third-party labs. Our test results are independent of all other parties, and testing by other parties may produce different results. We understand that many variables are involved in testing, some of which are extremely difficult to control. These reports are not meant or intended for any other purpose but to uphold H2 Hubb LLC's business practices and to validate the reasons for our recommendations.



Approved By: Tywon Hubbard

A handwritten signature in black ink that reads 'Tywon Hubbard'.

CEO, H2HUBB LLC