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H₂ HUBB Official Test Report

Product:

Name: H₂Life Hydrotherapy Generator for baths

Company: Hydrogen For Health

Type: Hydrogen Bath Generator

- No electrolytic cell
- Requires external hydrogen inhaler or generator

Tester: Tywon Hubbard (TH)

Testing start date: 2/21/23

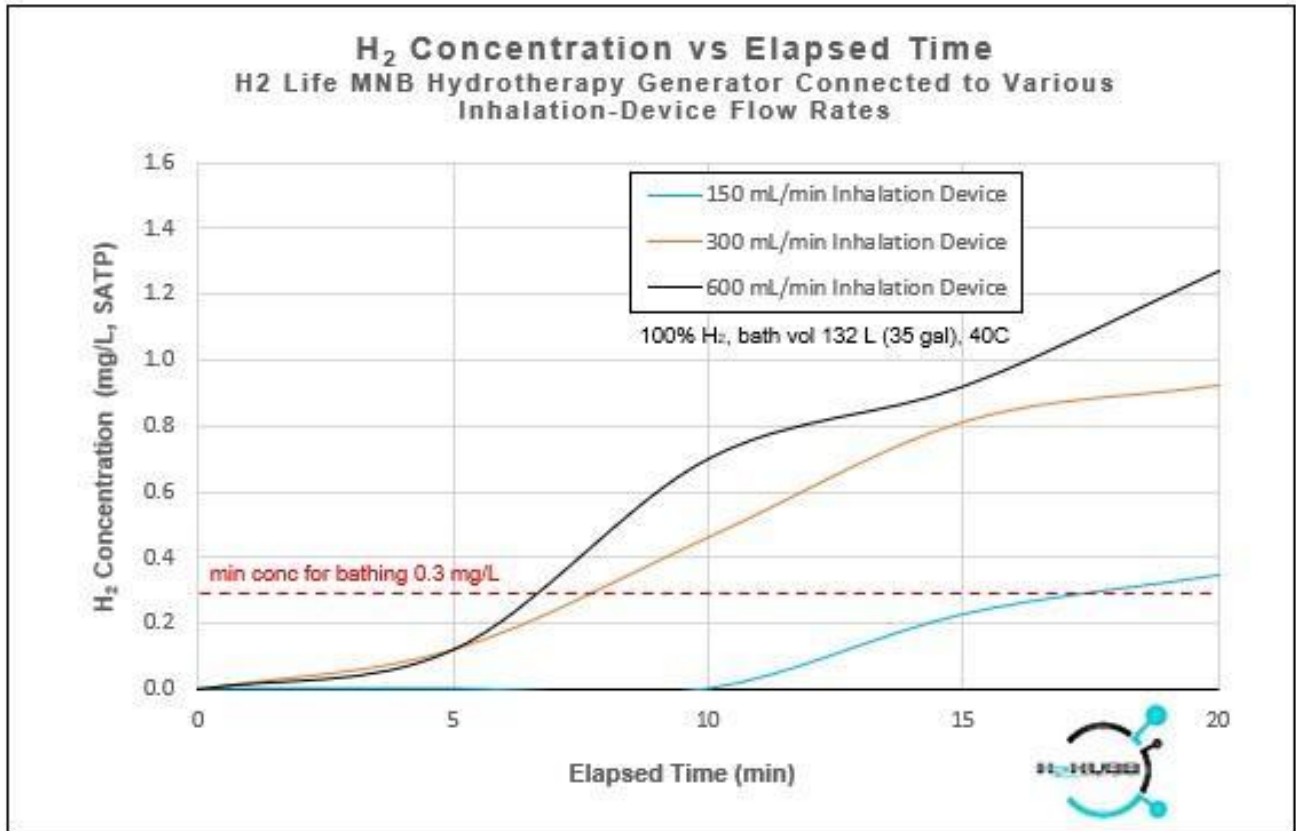
Completion date: 3/13/23

PERFORMANCE:

H₂ Concentration Confirmation Test:

- **METHODOLOGY:**
- Municipally-Supplied Water
- Bathtub Water Volume: 132.5L (35 gals)
- Water Temperature: 104°F/40°C
- Various Pure H₂ (99.99%) outputs:
 - 150 mL/min
 - 300 mL/min
 - 600 mL/min
- Dissolution Time-Frame: 20 mins
 - The duration of time given to allow the device was able to dissolve H₂ in the bath water.
- Mg/L (ppm) H₂ Concentration Testing Intervals: 5, 10, 15, and 20 minutes.
- Test Elevation: 277 meters (909 ft)
- Dissolved H₂ Test Methodology: Titration: H₂Blue® Test Reagent
- All dissolved H₂ measurements adjusted to SATP (water temp and pressure)
- Calculated H₂ mg/L saturation point at 104°F (40°C): 1.40 mg/L
- Confirmed that the device is able to achieve H₂HUBB's therapeutic minimum standard for H₂ baths: 0.3 mg/L (ppm) of H₂

H₂ mg/L Concentration Test and Graph data:



Graphing Data

- H₂ Flow Rates:**
 A. 150 mL/min
 B. 300 mL/min
 C. 600 mL/min

Time (mins)	H ₂ Concentrations (mg/L (ppm))		
	A	B	C
0.00	0.00	0.00	0.00
5.00	0.00	0.12	0.12
10.00	0.0	0.46	0.70
15.00	0.23	0.81	0.92
20.00	0.35	0.92	1.27

- H₂HUBB's therapeutic minimum standard confirmed: Yes

INTERNAL BREAKDOWN AND PERFORMANCE:

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

- **Applied volts:**
 - 24 volts
- **Total Amps:**
 - 8.0 amps
- **Total watts:**
 - 192 watts

PRODUCT ASSESSMENT:

Functionality:

- **Power button**
 - Turns the system on.
 - Activates water pumps/micro-nano bubble generator.
- **H₂ input port**
 - Delivers supplied hydrogen gas to recirculating bath water for producing the H₂ bath.
- **Water inlet port**
 - Draws bath water from the tub.
- **Water outlet port**
 - Delivers hydrogen-infused water back to the bathtub.

Reliability:

- **New: Yes**
 - Initial test results and evaluation are currently on the report. (see Overall Opinion)
- **3 months: N/A**
- **6 months: N/A**
- **1 year: N/A**
- **Reliability Summary: N/A**

COST:

- **H₂Life Hydrotherapy Generator for baths: \$1,495.00 USD**
- **H₂Hubb discount: TBA**
- **H₂Hubb recommendation cost: TBA**

Overall Opinion:

Hydrogen For Health H₂Life Hydrotherapy Generator for baths is a well-engineered hydrogen bath device based on our testing. The unit is claimed to produce micro-nano bubbles of H₂ and dissolve them in the bath water at a therapeutic concentration. Because the system requires an external inhalation device to supply hydrogen gas, we decided to utilize 3 different flow rates of pure hydrogen gas (99.99%) to determine the device's efficacy for dissolving hydrogen gas into the bath water. This is a crucial point of analysis, as there are numerous inhalation devices on the market that supply hydrogen gas at various flow rates and concentrations. Therefore, we sought to determine how the bath device would perform in dissolving hydrogen gas into the water at a low-flow rate, mid-flow rate, and high-flow rate. We accomplished this, by using a 150 mL/min portable H₂ inhaler, and mid to high-range flow rate hydrogen inhalation systems. This allowed us to reproduce H₂ bath conditions that the everyday consumer might experience using various systems to see if these flow rates can produce therapeutic concentrations of H₂ in the bath. Our mg/L (ppm) H₂ concentration test was conducted in 5-minute intervals for 20 minutes. We chose a period of 20 minutes for performing our tests because 20 minutes allows the H₂ bath device adequate time to infuse hydrogen gas into the bath water (allowing for equilibrium to occur) while preventing the bath water temperature from falling to an uncomfortable level. We confirmed this with our time-vs-temperature testing and demonstrated that the bath water only dropped by 1.64°C (3°F) (e.g. 40°C to 38.36°C or 104°F to 101°F) in 20 minutes. We were able to confirm the manufacturer's claims even with the lowest flow rate used (150 mL/min of H₂). We measured the dissolved hydrogen concentration at 0.35 mg/L (@ 150 mL/min), 0.92 mg/L (@ 300 mL/min), and 1.27 mg/L (@ 600 mL/min) at the 20-minute mark respectively. Based on the water volume of the bath 132.5 L (or 35 gals), that means that the device can dissolve 46-168 mg of H₂ in the water of an average tub. These are impressive results.

At the H₂ flow rate of 600 mL/min, the device nearly reached the hydrogen gas saturation point of 1.40 mg/L (ppm) at 40°C (104°F) within the 20-minute mark. Based on the measurements at 600 mL/min, the device was able to reach 92% hydrogen gas saturation point at 40°C. This is impressive and, at those H₂ concentrations, the bath should be highly therapeutic based on the studies.

The dissolved hydrogen levels appear to correlate well with the biomedical research of molecular hydrogen for topical applications. We acknowledge that more research is needed to definitively determine the therapeutic dissolved H₂ target area for topical applications for molecular hydrogen. Nevertheless, based on our examination of the current preliminary data on the subject, H₂HUBB believes it is possible that 0.3 mg/L (ppm) represents the minimum therapeutic target for the dissolved H₂ concentration and has subsequently set that as our minimum [performance standard](#). The H₂Life Hydrotherapy Generator for baths surpassed this standard at all three flow rates within a typical bath water temperature range (38~40°C).

A point of consideration based on the data is that it requires 17 minutes to generate a therapeutic level of H₂ in the bath water with an H₂ inhalation unit rated at 150 mL/min. But, only 6-7 minutes were required for the systems with higher flow rates (300 & 600 mL/min) to produce a therapeutic concentration of hydrogen gas in the bath. Therefore, we suggest that the bath device be used with mid to high-flow-rate H₂ inhalation devices rather than smaller portable H₂ inhalers (e.g. 50-150 mL/min), even though it is feasible to use those systems.

We believe this device will be a popular hydrogen device in the marketplace. We are impressed at the dissolved hydrogen concentration that can be generated with this system even at a low-flow rate. Overall, the performance of the product surpassed all of our H₂HUBB standards and we would like to move forward with recommending the product publicly.

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 business practices and to validate the reasons for our recommendations.

Approved by: Tywon Hubbard

A handwritten signature in black ink, appearing to read 'Tywon Hubbard', with a stylized flourish at the end.

Tywon Hubbard,
CEO, H₂ HUBB LLC.

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