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H_2 HUBB Official Test Report

Product:
Name: H_2 Respire 150
Company: Q-Life (Micro Research Institution Inc)
Type: Portable H_2 Inhalation Device

- Pure H_2 Inhalation (>99.99)
  - PEM/SPE
- Hydrogen-rich water
  - Bubbling via specialized diffusion stone.

Model: H2R-150
Serial number: H2R210600007
Tester: Tywon Hubbard (TH)
Testing start date: 8/19/21
Completion date: 8/30/21

PERFORMANCE:

H_2 mL/min Confirmation Test: H_2 Respire 150

- **METHODOLOGY:**
- Distilled Water (used for testing): 6 pH
- Water Temperature: 65~70F/ 18.3~21.1C
- Reservoir Vol Size: 0.550 L/550 mL
- Claimed H_2 output: 150 mL/min or 12.36 mg/min (@ SATP)
- Test Location: 277 meters (909 ft elevation)
- H_2 Flow Test: mL/min, normal timing for breathing session
  - Test methodology: Gas Displacement
  - All measurements Converted to SATP

H_2 mg/L Concentration Test: Specialized H_2 Diffusion Stone

- **METHODOLOGY:**
- Distilled Water
- Water Temperature: 65~70F/ 18.3~21C
- Water Volume Size:
  - 500 mL
  - 1000 mL
- Infusion Time-Frame: 10-minutes
- Test Location: 277 meters (909 ft elevation)
- Test Methodology: Titration: H_2Blue Test Reagent
- All mg/L Test Converted to SATP (water temp and pressure)
- Claimed H_2 mg/L: 1.3~1.4 mg/L (10-minutes)

H_2 Flow Test at SATP:

- **Device H_2 mL/min (mg/min) avg:** 145.14 mL/min: converts: 12.0 mg/min
- **Claimed Mfgr's H_2 mL/min (mg/min) confirmed:** Yes

H_2 mg/L (ppm) Concentration Test at SATP:

- **500 mL avg mg/L (ppm):** ≅ 1.35 mg/L (ppm)
- **1000 mL avg mg/L (ppm):** ≅ 1.25 mg/L (ppm)

- **Avg H_2 mg Produced in Designated Vol:**
  - **500 mL:** ≅ 0.70 mg
  - **1000 mL:** ≅ 1.25 mg
- **Claimed Mfgr's H_2 mg/L (mg/min) confirmed:** Yes

INTERNAL BREAKDOWN AND PERFORMANCE:

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

- **Type of device/electrolytic cell**
  - Pure H_2: PEM/SPE membrane
- **Applied volts:**
  - 12 volts
- **Total Amps:**
  - 8 amps
- **Total watts:**
  - 96 watts

PRODUCT ASSESSMENT:

Functionality:

- **Power on/off button**
  - Turns the system on and off.
  - Initiates electrolysis for hydrogen gas inhalation.
  - Initiates 1 hr session time then shuts off.
- **Sessions times**
  - 1 Hour: Press the on/off button once.
  - 2 Hours: Press the on/off button twice.
  - 3 Hours: Press the on/off button three times.
- **Indicator lights**
  - **Blue light**
  - Indicates normal operation.
  - **Red light**
  - Water shortage protection
  - Device tilt protection
  - **Alternating Red/Blue light**
  - Impure water in the reservoir.
- **Requires distilled water or RO water only (550 mL reservoir)**
  - Aids to eliminates scaling on electrodes and possible H_2 gas contamination
- **Gas display window**
  - Allows clients to view gas production of the system with blue ambient light.
- **Hydrogen gas output port**
  - Allow clients to connect nasal cannula or hydrogen gas diffusion stone.
- **Cleaning function**
  - Press and hold down on/off button for 15 seconds.
  - 30 minutes session time-frame.

Reliability:

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

PRODUCT SAFETY:

Safety Components:

- The system has 4 key safety mechanisms improving the safety of the device.
  - Low water shortage protection
    - Prevent cell from excessive heat

- Device tilt protection
  - May prevent damages or leaks
- Ventilation
  - The system has an internal fan, a large heat sink, and has space to keep the housing ventilated and the PCB-board and/or system from overheating.
- Pure H_2 system
  - The system theoretically should only be combustible at the tip of the nasal cannula as the system produces >99% pure hydrogen gas.

As with all inhalation devices that produce pure hydrogen gas, care should be taken to avoid exposing the cannula tip to any source of ignition (such as an open flame or a spark) which could result in the combustion of the gas.

Cost:

- **Q-Life (H_2 Respire 150™):** $1299.00 USD
- **H_2 Hubb discount:** 129.90 (10%)
- **H_2 Hubb recommendation cost:** $1169.10 USD

Overall Opinion:

The Q-Life H_2 Respire 150 portable H_2 generator is a well-engineered pure H_2 inhalation based on our testing. The unit is rated by the manufacturer to supply 150 mL/min of pure hydrogen gas (99.999%) at 100% production capacity and provides a specialized diffusion stone (H_2 Nano stick) to dissolve hydrogen gas into water, creating hydrogen-rich water. It is claimed that the generator with the Nano Stick can dissolve hydrogen gas into 500 mL of water up to 1.40 mg/L (ppm) in 10-minutes. We were able to confirm the manufacturer's claims as our measurements corresponded well with the claimed maximum performance capacity of the device, which is 150 mL/min.

Hydrogen gas output flow rates are a critical performance parameter for inhalation devices. H_2HUBB's minimum flow rate standard for portable hydrogen generators or inhalation units (pure H_2, mixed with air, etc) is 50 mL/min of H_2 (50 mL/min ≈ >1% H_2 at resting breathing rates (4-6 L/min)). This is based on preliminary observations and/or several studies demonstrating that 1~1.3% (vol/vol) of H_2 may offer therapeutic potential. That is equivalent to 50-78 mL/min at 4-6L/min gas exchange or ventilation minute. Furthermore, Dr. Ohta (renowned hydrogen scientist with many publications on H_2) has stated 10-20 μMol/L appears to be the therapeutic target zone (for humans) for hydrogen gas within blood/plasma and cellular concentrations. It has been demonstrated that the production volume or flow rate output of 50 mL/min of pure hydrogen gas will produce 13 μMol/L of dissolved H_2 within systemic circulation with an oxygen mask or nasal cannula. The math of this conversion has been established in this scientific literature **source**. For these reasons, 50 mL/min of H_2 is our minimum standard for portable hydrogen generators and the H_2 Respire 150 easily surpasses this standard.

The H_2 Respire 150 utilizes a PEM/SPE electrolytic cell. This means the system will produce pure hydrogen gas (> 99.9%). We measured the system's hydrogen gas production at 145.14 mL/min at SATP. Our measurements confirm the manufacturer's claim of 150 mL/min at SATP. Based on our gas output measurements, we are pleased with the performance characteristics of the device.

The unit comes with a specialized diffusion stone called the H_2 Nano Stick for producing hydrogen water. The system performed well in our dissolved H_2 concentration testing for an open-to-the-atmosphere device. On average, the system was able to generate 1.35 mg/L (ppm) at SATP in the volume size of 500 mL of water and measured 1.25 mg/L (ppm) in 1 liter of water. This is equivalent to 0.70~1.25 mg of H_2 dissolved into the water meaning, theoretically, a person should be able to ingest a therapeutic dose of hydrogen gas with this product. The device was able to achieve this dissolved hydrogen concentration after 10 minutes of bubbling the water with hydrogen gas at a production rate of 145.14 mL/min.

Dissolved hydrogen concentration is a critical performance metric as research is suggesting that 1.0~3.0 mg of H_2/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. H_2HUBB's performance standard for hydrogen water devices is slightly higher than IHSA as we require the device to be able to provide a concentration of 0.8 mg/L (ppm) and 0.8 mg/day consistently. The system was able to surpass H_2HUBB mg/L and mg/day standard. We are pleased with the device's dissolved H_2 measurement.

The validity of the manufacturer's claims are not in question and the device performance meets the marketing material of the product. We have no safety concerns with the system as it seems to implement sufficient safety measures. We are generally pleased with the performance of the device. The H_2 Respire 150 device performed above our minimum performance standards and in the opinion of H_2HUBB, the system appears to be safe and suitable for in-home H_2 inhalation and H_2 water therapy. We desire to move forward with recommending the product to the public.

H_2 Hubb LLC disclaimer: All tests conducted and test results produced by H_2 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 H_2 Hubb LLC business practices and to validate the reasons for our recommendations.

Approved by: Tywon Hubbard



Tywon Hubbard,

CEO, H_2 HUBB LLC.

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