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H_2HUBB Official Test Report

Evaluation Introduction

This report provides a comprehensive analysis of the Gaura Silmare Pulse 120 Hydrogen Inhalation Device from VHLife, a company based in Taiwan. H_2HUBB classifies this device as a portable, household-grade, low-to-mid-flow system. The unit uses a PEM/SPE electrolytic cell to produce pure hydrogen gas and requires only deionized or distilled water. It supports continuous delivery and a breath-synchronized pulse mode with auto start/stop; sessions can run up to 2 hours, and in Auto mode the device continues producing hydrogen while the user is inhaling. We quantified hydrogen output (mL/min) to verify performance and assessed safety features and operating controls to confirm appropriate protections for safe, reliable use. This report determines whether the Gaura Silmare Pulse 120 meets H_2HUBB's product performance standards for approval and recommendation. For more information about our performance standards for hydrogen inhalation systems, please visit **H_2HUBB.**

H_2 Products

- Company: VHLife
- Product Name: Gaura Silmare Pulse 120
- Type: Pure H_2 Inhalation Device (99.995%%/4N)
  - PEM/SPE
  - low-to-mid Flow Rate
  - Pulse mode
- Mfgr rated H_2 Output: 120 mL/min
- URL Link: https://www.vhlife.com/zh/

Method and Procedure

- Distilled Water (used for testing): 6.0 pH
- Water Temperature: 65~70F/ 18~21C
- Reservoir Vol Size: 0.350 L/350 mL (11.83 oz)
- H_2 Output: 120 mL/min or 9.89 mg/min (@ SATP)
- Pulse mode equivalent: 360 mL/min or 29.68 mg/min (@ SATP)
- Test Location: 277 meters (909 ft elevation)
- H_2 Flow Test: mL/min, normal timing for a breathing session (1 hr)
- Test methodology:
  - Alicat H_2 Mass Flow Meter
  - Gas Displacement
- All measurements converted to SATP where applicable

Test Results

To measure hydrogen gas flow rate in continuous and pulse modes, the device was assembled per manufacturer guidance and filled with distilled water to the recommended level. The operating mode (normal or pulse) was selected via the mode button, and each condition was run for a 1-hour session with a 10-minute warm-up preceding measurement. Product gas was routed through a dryer, then a combined humidity/temperature sensor, and finally into an Alicat mass flow meter for quantification of molecular hydrogen output. For pulse mode, a calibrated gas-displacement apparatus was additionally employed to determine per-pulse volume and corroborate average pulse-mode flow. Before recording, the system was allowed 5–10 minutes to reach steady state to minimize mixing with ambient air. Minor calculations and corrections were applied to account for residual moisture, inline resistance from the dryer, and volumetric/thermal effects during pulse capture; reported values reflect these adjustments. A minimum of three tests were conducted per condition, and the reported flow-rate values are the average of those runs.

H_2 Flow Rate Test Results at SATP:

- Device H_2 output, avg: ≅ 150 mL/min (2.5 mL/s) ≈ 12.38 mg/min
- Device O_2 output (anode, vented): ≅ 75 mL/min ≈ 98 mg/min
- Total electrolysis production (H_2 + O_2): ≅ 225 mL/min

- Pulse Mode (no breathing / reservoir behavior)
- Pulse interval (no inhalation): ≅ 6–6.5 s
- H_2 available per pulse (calculated): ≅ 15–16.25 mL (2.5 mL/s × 6–6.5 s)
- H_2 released per pulse (measured): ≅ 13–15 mL

- Pulse Mode (while breathing / GMMS breath-sync)
- Breath interval: ≅ every 3–4 s
- H_2 per inhalation (calculated): ≅ 7.5–10 mL (2.5 mL/s × 3–4 s)
- H_2 per inhalation (observed): ≅ 7.5–10 mL
- Breath-trigger reliability: ≅ 90–100% of inhalations

- **Claimed Mfgr's H_2 mL/min (mg/min) confirmed: Yes**

H_2HUBB Hydrogen Flow Rate Assessment

- H_2HUBB's hydrogen gas flow-rate testing confirms that the Gaura Silmare Pulse 120 meets—and modestly exceeds—the manufacturer's stated output. Under SATP conditions, the device produced 150 mL/min of hydrogen in continuous operation, with consistent results across repeated runs, indicating stable slight over-delivery relative to the 120 mL/min claim. In pulse mode, breath-synchronized delivery concentrates production into inhalation, producing approximately 7.5–10 mL H_2 per breath for the vast majority of inhalations, which increases the effective inspired fraction of hydrogen by roughly three- to four-fold compared with continuous flow. Using a nasal cannula and a minute ventilation ($\dot{V}E$) of 5–6 L/min, this corresponds to an average inspired hydrogen concentration (FiH_2) of ~1.0% (5 L/min) or ~0.83% (6 L/min) in continuous mode versus ~3.0–4.0% (5 L/min) or ~2.5–3.3% (6 L/min) in pulse mode. These results exceed **H_2HUBB's minimum performance standards** and qualify the Gaura Silmare Pulse 120 as a **Level 3 hydrogen inhalation device** within our performance ranking system. The first ever H_2HUBB approved portable H_2 inhalation device to receive this rating.

INTERNAL BREAKDOWN AND PERFORMANCE:

Manufacturer's Rated Electrical Values:

- Type of device/electrolytic cell
  - Pure H_2: PEM/SPE membrane
- AC input: AC100–240 V, 50–60 Hz
- Maximum power: 60 W
- Rated H_2 flow: 120 mL/min (spec)

GMMS pulse system (manufacturer-listed)

- GMMS: respiration detection with auto start/stop
- Inhalation-triggered pulse delivery (releases H_2 only during inhale)
- Claimed intake-efficiency multiplier: ~2.5–3.5× vs normal/continuous mode
- Hydrogen "pulse efficiency" (manufacturer claim): ≈ 360 mL/min (continuous-equivalent)

Product Assessment

Functionality:

- **Power input/Power cord:**
  - Rear-mounted AC inlet; supplies power to the device (AC100–240 V, 50–60 Hz; grounded outlet recommended).
- **LED Digital Display and Control Panel:**
  - Start/Stop/Timer button and Mode/Sleep button.
  - Shows timer status and alarm indicators (water level/quality, temperature, pressure).
- **Output Flow:**
  - Pure H_2 via PEM/SPE cell.
  - Delivery modes: Normal (continuous) or Pulse (GMMS breath-sync).
  - Rated H_2 flow: 120 mL/min (H_2HUBB measured ≈150 mL/min at SATP).
- **Power Start/Stop Button:**
  - Starts electrolysis; long-press (~3 s) to stop and enter standby.
- **Timer:**
  - Auto (pulse mode with auto start/stop on detected breathing), 1-hour, or 2-hour sessions.
  - Last setting retained in standby.
- **Pulse Mode (GMMS):**
  - Detects inhalation and releases stored H_2 only during inhale to reduce waste.
  - Auto start/stop when cannula is put on/removed.
- **Sleep Mode:**
  - Press Mode for ~3 s to dim the display and touch panel; press again to wake.
- **Reservoir (~0.35 L / 11.83 oz):**
  - Fill to marked level with purified/distilled water; low TDS required (manual: ≤ ~5–10 µS/cm).
  - Front water-level window.
- **H_2 Outlet (1x):**
  - For single-user inhalation; includes silicone inhalation tube with dryer.
- **O_2 Vent (1x):**
  - Vents oxygen generated during electrolysis; keep unobstructed (remove plug when operating).
- **Drain Port:**
  - Bottom drainage outlet/plug to empty the tank before transport or maintenance.
- **Safety/Alarms:**
  - Low water level, poor water quality (high TDS), H_2 route blockage/pressure, high electrolyzer temperature.
  - Device auto-stops on alarms or when tubing is removed (auto mode).

Product Safety

Safety Components:

- The system has 9 fundamental safety mechanisms for ensuring the device's safety.
  - Low-water protection
    - Protects cells from excessive heat
  - Distilled water reservoir
    - Maintains purity; limits heat stress.
  - Timer/idle protection
    - 1 h / 2 h session limits.
  - Auto start/stop on breathing (GMMS)
    - Starts on inhale; stops if cannula off (~15 s).
  - Water-quality (TDS) alarm with auto stop
    - Auto-stop when water quality is out of spec.
  - Hydrogen line blockage/over-pressure alarm
    - Warns/halts when the outlet is obstructed.
  - H_2 cell temperature alarm
    - Shuts down on high cell temperature.
  - Internal Fans
    - Vent gas; aid cooling.
  - Heat Vents
    - Dissipate internal heat.

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.

Overall Opinion

The Gaura Silmare Pulse 120 Hydrogen Inhalation Device has been confirmed through our testing as a well-engineered system for hydrogen inhalation. The manufacturer rates the device to deliver 120 mL/min of 99.995% pure hydrogen gas under standard operating conditions. Our testing verified these claims, demonstrating that the device consistently achieves the specified hydrogen output, with measured results aligning with the rated flow rate. Additionally, our evaluation confirmed the functionality of the device's Pulse Mode, which enhances per-breath hydrogen delivery and effectively increases inhaled hydrogen concentration in alignment with the manufacturer's intended design.

Hydrogen gas output flow rates are a critical performance parameter for inhalation devices. At H_2HUBB, the minimum standard for hydrogen generators or inhalation units (whether pure hydrogen, oxyhydrogen, or H_2 mixed with air) is 120 mL/min of H_2. This rate corresponds to approximately 0.7-1.0% H_2 at a resting breathing rate of 4-6 L/min when using a nasal cannula for an average adult. Scientific studies on molecular hydrogen inhalation therapy generally utilize concentrations between 0.5% and 4% or more at resting breathing rates, a range that has been shown to provide therapeutic benefits. Given these findings, H_2HUBB establishes 120 mL/min of H_2 as the baseline requirement for hydrogen inhalation devices to ensure effectiveness. The Gaura Silmare Pulse 120 H_2 inhalation device significantly exceeds this minimum standard, delivering performance within the therapeutic range.

The Gaura Silmare Pulse 120 uses a PEM/SPE electrolytic stack configured as two cells in series to produce high-purity hydrogen (>99.99%). In our testing at SATP, the device delivered 150 mL/min of H_2 (≈12.37 mg/min) in continuous operation. Using our electron-count method (1 A ≈ 7.6 mL/min H_2 per cell), a two-cell series stack producing 150 mL/min corresponds to an operating current of ≈10.5 A. Within the 60 W nameplate, the estimated DC operating point at the stack is ≈4.0–5.0 V (≈2.0–2.5 V per cell), or ≈40–50 W. At 10.5 A, the theoretical 100%-efficiency output is ~160 mL/min; our measured 150 mL/min indicates ~94% cell efficiency and a ~25% over-delivery relative to the manufacturer's 120 mL/min specification. This suggests the manufacturer has taken a conservative approach in its specifications, opting to under-promise and over-deliver—an approach that deserves commendation. These values support classifying the Silmare Pulse 120 as a portable, household-grade, low-to-mid-flow hydrogen inhalation system. **According to our flow-rate testing, we will list this device on our website as a Level 3 hydrogen inhalation system, specifically due to its GMMS breath-synchronized pulse mode; details follow in the next section.** You can view the meaning of this ranking **here**.

GMMS Pulse Mode (Gaura Silmare Pulse 120)

The GMMS pulse mode releases hydrogen only during inhalation to reduce waste between breaths. After selecting Pulse with the Mode button, the system detects each inhale (negative pressure at the cannula) and delivers a small stored dose of H_2. Based on our testing, with a measured production of 150 mL/min (≈2.5 mL/s), typical per-breath delivery is ~7.5–10 mL at ~3–4 seconds between breaths, and up to ~12–13 mL at ~5 seconds between breaths (~12 bpm). When no one is inhaling, we observed a reservoir purge of ~13–15 mL every ~6–6.5 seconds, implying a reservoir capacity of ~15–16 mL. Based on our testing, breath-trigger reliability was ~90–100% of inhalations.

Minute ventilation (VE) is the total air you move each minute (generally 4–8 L/min at rest). FiH_2 (inhaled hydrogen percentage) is the amount of hydrogen that actually reaches the lungs during inhalation each minute divided by VE. Based on our testing, in continuous mode about 50 mL of H_2 reaches the lungs during inhalation each minute (we generally inhale ~20 seconds out of 60), so $FiH_2 \approx 50 \div VE$ (e.g., 50/5000 mL = 1% inhaled H_2). In GMMS pulse mode, H_2 is delivered only in the inhalation window, allowing about 150 mL of H_2 per minute to reach the lungs during inhalation, so $FiH_2 \approx 150 \div VE$ (e.g., 150/5000 mL = 3% inhaled H_2). Functionally, this concentrates the same minute production (150 mL/min of H_2) into the ~33% inhalation window (~20 seconds of inhalation per minute at rest), which raises the inspired hydrogen concentration about 3–4 times versus continuous flow at the same VE. Using VE = 5–6 L/min, this corresponds—based on our testing—to ~1.0% (5 L/min) or ~0.83% (6 L/min) in continuous mode versus ~3.0–4.0% (5 L/min) or ~2.5–3.3% (6 L/min) in pulse mode. These findings are consistent with our per-pulse gas-displacement measurements and continuous-flow verification.

Below you will find a table for FiH_2 versus minute ventilation (VE) up to 8 L/min at a resting breathing pattern of ~12 breaths per minute (~5 seconds per breath; ~3–4 seconds between inhalations depending on I:E).

Inhaled H_2 (%FiH_2) vs Minute Ventilation (VE): Continuous vs GMMS Pulse

$\dot{V}E$ (mL/min)	Continuous FiH_2	Pulse FiH_2 (7.5–10 mL per breath @ ~20 bpm)
4,000	1.25%	3.75–5.00%
5,000	1.00%	3.00–4.00%
6,000	0.83%	2.50–3.33%
7,000	0.71%	2.14–2.86%
8,000	0.71%	1.88–2.50%

The manufacturer's hydrogen output claim for the Gaura Silmare Pulse 120 was validated by our testing under SATP; we measured 150 mL/min, modestly exceeding the 120 mL/min specification. Based on our testing, GMMS pulse mode concentrated delivery into inhalation and produced a 3–4× increase in inspired H_2 fraction at typical resting VE (5–6 L/min), consistent with the device's operating logic. We identified no safety concerns during evaluation; the system's protections (low water, water quality, pressure, temperature, and auto start/stop on breathing) functioned as intended. Overall, the device meets H_2HUBB's minimum performance standards and is suitable for in-home hydrogen inhalation. We are confident in recommending the Gaura Silmare Pulse 120 to the public.

Approved by:

Tywon Hubbard

CEO, H_2HUBB LLC

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