



How Does a Hydrogen Therapy Machine Work?

From distilled water to a controlled
hydrogen/oxygen gas stream

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The Short Explanation

An H2=E machine uses electricity to split purified water into hydrogen and oxygen. This process is called electrolysis. A solid polymer membrane helps control the reaction and keep unwanted impurities out of the gas path.

1 Pure water	2 Electrical energy	3 Electrolysis cell	4 Gas delivery
Distilled water enters the system.	A controlled current is applied.	Water separates into H2 and O2.	Low-pressure gas passes through a humidifier and cannula.

The natural ratio

The electrochemical reaction produces two hydrogen molecules for every one oxygen molecule: $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$. By volume, the resulting mixed stream is approximately 66.6% hydrogen and 33.3% oxygen.

What the machine does not do

- It does not store a cylinder of compressed hydrogen.
- It does not require chemical electrolyte additives in the water reservoir.
- It does not change the laws of chemistry or create a special “golden ratio” with proven therapeutic properties.
- It does not determine a medical dose or guarantee a health outcome.

The Language Made Simple

Term	Plain-English meaning
Hydrogen	The element hydrogen. In gas form it usually exists as H ₂ .
Molecular hydrogen / H ₂	Two hydrogen atoms bonded together; the form studied in hydrogen research.
Hydrogen/oxygen	A mixed stream containing H ₂ and O ₂ , commonly produced by water electrolysis.
Oxyhydrogen	A general name for a mixture of hydrogen and oxygen gases.
Brown's Gas	A marketing or historical term often used for oxyhydrogen from alkaline electrolyzers; definitions vary.
PEM	Proton exchange membrane, a polymer layer that conducts protons while separating reaction pathways.
SPE	Solid polymer electrolyte; often used for the same membrane-based technology.

A note about “Brown’s Gas”

Claims that Brown’s Gas contains a special form called “electrically expanded water” with unique therapeutic effects are not established scientific facts. H2=E therefore describes its output directly and accurately as a hydrogen/oxygen gas mixture produced by pure-water PEM/SPE electrolysis.

Inside the Electrolysis Cell

The electrolysis cell is the heart of the machine. It contains two electrodes separated by a proton exchange membrane.

Component	What happens
Anode (+)	Water is oxidised, producing oxygen, positively charged hydrogen ions (protons) and electrons.
PEM / SPE membrane	Allows protons to pass through while limiting crossover of gases and blocking electrons.
External circuit	Carries electrons around the membrane to the cathode.
Cathode (-)	Protons and electrons combine to form molecular hydrogen gas (H ₂).

Why use a membrane?

- It enables electrolysis using high-purity water without a liquid chemical electrolyte.
- It helps manage separation and purity inside the reaction cell.
- It supports compact, low-pressure, on-demand gas generation.

H2=E states that its current Hydro Nova range uses an N117-type proton exchange membrane. The cell assembly, electrodes and operating controls work together; the membrane is not a routine user-replaceable part.

Correct terminology

The process is electrolysis, not hydrolysis. “Hydrolysis cell” is sometimes used informally, but “electrolysis cell” is the technically correct term here.

From the Cell to the Cannula

Stage	Purpose
Gas generation	Hydrogen and oxygen are produced only while the machine is operating.
Internal gas path	Tubing, valves and sensors guide the low-pressure stream.
Humidifier bottle	Adds moisture for comfort and provides a visible bubbling indicator.
Water trap / check valve	Helps manage condensation and reduce unwanted backflow.
Nasal cannula	Delivers the gas near the nostrils while the user continues to breathe surrounding room air.

Why no compressor is needed

The electrolysis cell generates a steady low-pressure flow suitable for an open nasal-cannula system. Avoiding a compressor reduces noise, weight and moving parts. It does not by itself prove clinical suitability; use must still follow the current manual.

Ambient-air mixing

A nasal cannula is an open delivery system, so the machine output mixes with room air and with air drawn through the mouth or around the cannula. The final inhaled concentration varies with machine output, breathing rate, cannula position and ventilation. It should not be described as a fixed 2% or assumed always to remain below a particular threshold without measurement.

Water Quality, Filter and Humidifier

Water purity has a major influence on electrolysis-cell performance. Minerals and contaminants can increase deposits, affect electrical behaviour and shorten component life.

Use the right water

- Use only the distilled or deionised water specified in your model's manual.
- Check water with the supplied TDS meter before filling.
- Keep the reservoir, filling tools and bottle openings clean.
- Never add salt, minerals, flavourings, medicines or alkaline electrolyte.

What the internal filter does

The resin filter provides an additional safeguard against trace ionic contamination. Replacement intervals depend on model, water quality and use; follow the current manual rather than relying on a universal 6-12 month rule.

What the humidifier does

Function	Benefit
Humidification	Moistens the gas stream for greater nasal comfort.
Flow indicator	Bubbling shows that gas is passing through the bottle.
Condensation management	Works with the correct tubing and water trap to limit droplets reaching the cannula.
Backflow protection	The system design may include check valves; never rely on water alone as the safety barrier.

Membrane Life and Maintenance

The PEM is integrated into the electrolysis-cell assembly. It is not a routine consumable, and its useful life depends on water purity, operating temperature, run time and overall cell condition.

Rated life is not a guarantee

A manufacturer's stated operating-hour figure is a design or test rating, not a promise that output remains unchanged forever. Performance can vary with use and maintenance.

Signs that need attention

- A persistent reduction in bubbling or measured output.
- Repeated water-quality, temperature, pressure or flow warnings.
- Unusual noise, smell, leakage or visible corrosion.
- The machine stopping unexpectedly or failing its normal start-up checks.

Do not diagnose the membrane solely by watching a diffusion stone. Bubble appearance is influenced by water depth, stone condition, tubing and flow setting. If output appears to have changed, check the manual and contact H2=E support for model-specific assessment.

Routine care

- Use approved water every time.
- Change filters and clean external accessories on schedule.
- Keep ventilation openings clear and the machine upright.
- Do not open or repair the electrolysis cell yourself.

Hydrogen Safety Explained

Hydrogen is flammable. In ordinary air, its lower flammability limit is approximately 4% by volume. A hydrogen/oxygen mixture can ignite readily if it accumulates near an ignition source.

Why the 2:1 output ratio needs context

The 66.6% H₂ / 33.3% O₂ figure describes the gas stream leaving the electrolysis process - not necessarily the final concentration in the air a person breathes. An open cannula introduces dilution, but the degree varies. More importantly, gas released into a poorly ventilated space can accumulate.

Essential rules

Always use the machine in a well-ventilated room. Keep it away from flames, cigarettes, candles, gas hobs, sparks, static-discharge risks and hot surfaces. Never enclose the outlet or operate the machine in a sealed space.

Built-in safeguards may include

- Water-level and water-quality monitoring.
- Temperature, pressure and flow sensing.
- Automatic shutdown if an abnormal condition is detected.
- Check valves and low-pressure, on-demand production.

Safety features reduce risk; they do not replace correct setup and ventilation. Follow the instructions for your exact model.

Purity, Ozone and Certification

Pure-water PEM electrolysis is designed to avoid the liquid chemical electrolytes used in many alkaline systems. That reduces the risk of electrolyte carryover, but gas purity still depends on materials, cell design, water quality and operating condition.

Ozone

Ozone is generated under particular electrochemical conditions and electrode materials. H2=E states that testing of a sample machine found no ozone or harmful by-products. Any laboratory result applies to the tested sample and method; it should not be broadened into an unlimited claim for every device throughout its lifetime.

Understanding purity numbers

A reported hydrogen purity figure refers to the hydrogen component assessed by the test method. It is different from the composition of the mixed H₂/O₂ output and different again from the final concentration inhaled after mixing with room air.

Claim	What to check
CE marking	The exact model, declaration of conformity and applicable UK/EU requirements.
Laboratory gas test	Sample identity, test method, date, detection limits and full report.
Medical-device registration	Country, intended use, classification and whether it applies in the UK.
ISO-certified manufacture	The certificate scope, facility and current validity.

Certification does not establish that a machine treats disease. H2=E can provide current product documentation on request.

How the Whole System Works

Input	Process	Output
Approved distilled water + electricity	PEM/SPE electrolysis, sensors, cooling, humidification and low-pressure flow	A mixed hydrogen/oxygen stream delivered through an open cannula

Five things to remember

- The machine splits water by electrolysis; it does not store compressed gas.
- The natural output ratio is about two parts hydrogen to one part oxygen.
- The membrane helps conduct protons and manage the electrochemical pathways.
- Water quality and correct maintenance protect performance and longevity.
- Hydrogen is flammable: ventilation and separation from ignition sources are essential.

Simple to use. Sophisticated inside.

Fill with approved distilled water, connect the correct cannula, choose the session time and follow the manual. The machine manages the electrolysis process; you provide the safe environment.

Questions about your model?

Website	WhatsApp	Email
HydrogenTherapyH2E.com	07389 764119	HydrogenTherapyH2E@gmail.com

General educational information only. Hydrogen/oxygen inhalation is not intended to diagnose, treat, cure or prevent disease. Always follow the current manual supplied with your machine.