Osmio Infinity Hydroxy Gas/Water Production Electrolysis System User Manual

Version 0.7

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Disclaimer
Osmio Solutions Ltd reserves the right to change its products and services at any time to incorporate technological developments. This manual is subject to change without prior notice as part of continuous product development. Although this manual has been prepared with every precaution to ensure accuracy, Osmio Solutions Ltd assumes no liability for any errors or omissions, or for any damages resulting from the application or use of this information. This manual supersedes all previous versions.

No liability for consequential damages
Osmio Solutions Ltd shall not be liable for any indirect or consequential damages whatsoever arising out of the use or inability to use this product.

Power failure
The system requires uninterrupted power supply in order to operate correctly.

Warranty
The Osmio Infinity Hydroxy Gas/Water Production Electrolysis System is fully guaranteed for 3 years against defective parts and materials, including defects caused by poor workmanship. Osmio Solutions Ltd will repair or replace defective parts or materials during the term of the 3 year warranty at no extra charge providing that the system has been used and maintained in accordance with the following instructions. The warranty is invalid if products have been misused, used not in accordance with manual or abused.

For the 3 year warranty to be effective, the product must have been purchased directly from Osmio Solutions Ltd. The guarantee is not transferable to a third party without prior written approval from Osmio Solutions. It is strictly prohibited to modify or upgrade the system in any way. Failure to comply with this precaution will void the warranty of the system.

Osmio Solutions Ltd, Buckland Lake Reserve, Buckland Road, Cliffe Nr Rochester ME3 7RT. www.osmiowater.co.uk
The following symbols and markings appear on the system or in this user manual.

Warning always follow instructions as detailed in the manual wherever this symbol is shown. All instructions relating to routine maintenance and servicing must be observed as serious damage to health or the system may otherwise occur.

Do not open the Osmio Infinity without express written manufacturer consent. There are no user serviceable parts inside and there is danger of electrical shock. Only for use with a standard UK 220 – 240 V three pin plug in an earth bonded RCD protected circuit.

The Osmio Infinity uses a caustic lye solution as the catalyst for efficient electrolysis. Please ensure you handle this using appropriate safety equipment.

Highly Flammable keep away from any surfaces or equipment that generate heat or static electrical sparks e.g. electric radiators, tongs Keep away the Osmio Infinity away from open flames, never use near a gas fire, gas cooker, open fire, or candles

Combustible in air if Hydrogen gas concentration exceeds 4%

Never use the Osmio Infinity while smoking – danger of explosion, fire, and personal injury

Do not inhale air/Hydrogen mixture that exceeds 4% (by volume) and ensure HydrOxy gas has been adequately scrubbed (see manual for details) prior to inhalation

Ensure that the system is cleaned and maintained as per 6.0 of the manual to avoid build up of harmful bacteria

OSMIO INFINITY SYSTEM USER MANUAL	
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Contents

1.0 Introduction

This manual has been developed to support practitioners, individuals and clinicians who are using the system in a practice, at home or in a clinical setting. Its purpose is to give a better understanding of the technical requirements regarding installation, use and maintenance of this system. The manual also aims to provide support to personnel responsible for technical management and maintenance.

The following information is included in this manual:

- Photographs or diagrams, or a combination of both to identify the different parts of the system and accessories
- A brief explanation on the main uses or applications of the equipment
- A basic description of the principles by which the equipment operates
- Installation requirements with emphasis on the electrical aspects and the requirements for safe installation and operation
- Basic routine maintenance classified according to the required frequency (daily, 100 hours, 500 hours).
- Troubleshooting table with the most frequent problems affecting the equipment with possible causes and actions that may resolve these problems.
- Glossary of terms used

This information, along with good use and care, helps to maintain the system in optimal condition.

You have received this manual on successful completion of the required safety training. Your certificate is valid for 2 years and ongoing recertification is required. Osmio Solutions will contact you prior to the expiry of your certification to arrange this.

1.1 Intended Use

The Osmio Infinity Hydroxy Gas/Water Production Electrolysis System is designed to produce a gaseous mixture of hydrogen, oxygen, and electrically expanded water. It is a stand-alone system which can be used in research, in a clinical setting, or in the home to produce Hydroxy gas for inhalation. It is recommended to follow the instructions carefully to ensure safe use and practice.

1.2 Principal of Operation

The system uses a catalyst and 0 total dissolved solid (TDS) water to produce gas by electrolysis. The catalyst is required to allow the electrical current to flow through the water and produce gas at the positive and negative electrodes. The gases are then bubbled through two humidifiers to remove any residual lye before either being inhaled by the individual using a nasal cannula or using the spot applicator to topically treat specific areas on the body.

Humidifier-1

Humidifier-2

2.0 Safety Precautions

The Osmio Infinity Hydroxy Gas/Water Production electrolysis system generates a mixture of hydrogen and oxygen gasses that are potentially combustible and explosive. As long as the percentage of hydrogen in the air is less than 4% then the gaseous mixture is non-combustible. A static electrical spark striking the outside of one of the containers can ignite the gas inside. To ensure safe operation of the system the following safety precautions should be adhered to at all times.

2.1 Power Safety

- For use only with a standard UK 220 – 240 Volt three pin plug
- Plug into an earth bonded, RCD (Residual Current Device) protected circuit
- Use in a grounding socket with rated current above 10 Amps
- Do not use if the power cord/plug is damaged, dirty or if the plug is loose
- Use a clean dry cloth to wipe the power plug clean of any dust, water or other foreign matter and ensure it is dry before plugging in to operate the system

The system has an internal pressure safety switch (electrical shutoff) set for a maximum of ~2 psi. If the internal pressure builds to over 2 psi the green light and the gas production will shut off.

When the pressure is below 2 psi, the green light will turn on and the gas production will re-start. For safety, the pressure is kept very low, and electrical shut off is used so gas production stops. There is a mechanical gas pressure relief as a final precaution.

2.2 Set Up

- Position on a stable flat surface
- For indoor use only in a well ventilated room or area
- Do not use outdoors or in situations where the user or system could become wet
- Avoid direct sunlight and moisture
- Do not install near heating equipment, electrical heating products or in other high temperature places
- Do not install near combustible gases or near any flammable substances

2.3 Operating the System

- Use personal protective equipment (PPE) when preparing the electrolyte solution
- Prepare electrolyte (sodium hydroxide/lye) as directed and always keep off the skin and out of the eyes
- Only use 0 TDS water in the system
- Replace the water in the humidifiers and system as directed
- Clean Tubing, cannula and humidifiers as directed
- Follow the system operation checklist prior to use

- Avoid static electricity sparks igniting the gas by discharging any static charge prior to operation (touch the system case before touching any of the containers or tubes that contain Hydroxy gas).
- Never leave the machine running when not in use

Lye is corrosive and should only be handled using the appropriate PPE. If ingestion, inhalation, dermal and ocular exposure occurs, rinse thoroughly with cold water for 5 minutes. Seek immediate medical attention.

3.0 Installation

The Osmio Infinity Hydroxy Gas/Water Production Electrolysis system weighs approximately 6 kg and care must be taken when lifting it.

The Hydrogen gas produced can be detected by some carbon monoxide detectors which may alarm when there is an Osmio Infinity operating in the same room. Please note the system does NOT produce carbon monoxide! Do not de-activate carbon monoxide alarm.

3.1 Unpacking

- Move the packed system to its site of operation
- Unpack the Osmio Infinity Hydroxy Gas/Water Production Electrolysis system and accessories carefully

- Place the system on a flat surface
- Retain the original packaging for future transportation - the packaging is designed to assure safe transport and minimise transit damage
- Use of alternative packaging materials may invalidate the warranty
- If you relocate your instrument or ship it for service, refer to 'How to pack for 500 hour service' on page 32

Do not touch or loosen any screws or parts other than those specifically designated in the instructions. Doing so will void the system warranty.

3.2 Check Delivery for Completeness or Damage

- Print off packing list and check against order
- Visually inspect the transport package, the system, and the accessories for any possible transport damage.
- If any parts are missing or damaged, contact Osmio Solutions Ltd within 48 hours

If the system has been damaged contact Osmio Solutions Ltd to arrange shipment for replacement/repair.
Packing List

Item	Quantity	Received
Osmio Infinity Hydroxy Gas/Water Production Electrolysis System with TDS meter	1	
Tower Cap and PTFE Tape	1	
Humidifier Bracket	1	
Humidifier - 1	1	
Humidifier - 2	1	

Tower cap to Humidifier - 1 tube (SO-676)	1	
Humidifier 1 to Humidifier - 2 tube (2002-7 2.1m)	1	
Spot applicator	1	
Eye applicator (goggles)	1	
Nasal Cannulas	2	
Plastic funnel	1	
Power cord	1	
50 ml syringe	1	
Bubbling stone	1	
Humidifier - 1 to spot applicator tube	1	
Lye	1	
Gloves	1	
Stirring rod	1	

3.3 Environmental Conditions

- For indoor use only
- Temperature range 5°C to 40°C
- Installation category II
- Pollution Degree 2
- Altitude < 2000m
- When you set up the system avoid sites of operation with excess dust, vibrations, strong magnetic fields, direct sunlight, draft, excessive moisture, or large temperature fluctuations

- Place on a surface that is flat, dry, clean, vibration-proof, and leave additional room for cables, tower cap, and so on
- Ensure there is sufficient room to enable disconnecting the device
- The ambient air should be clean and free of corrosive vapours, smoke, and dust

Do not operate the instrument in an environment where potentially damaging liquids or gases are present.

3.4 System parts and accessories

1	Main Power Switch	17	TDS Meter
2	Timer Switch	18	Handles
3	Frequency Buttons	19	Gloves
4	Duty Cycle Buttons	20	50 ml Syringe
5	Green Gas Production Light	21	Nasal Cannula
6	Red Over-Full Liquid Level Light	22	Humidifier - 2 to Spot Applicator/Remote Bubbler tube
7	Internal water level sight tube	23	Humidifier - 1 to Humidifier - 2 tube
8	Red Low Liquid Level Light	24	Lye
9	Timer Active Indicator Light	25	Tower Cap
10	Hour Meter	26	Tower Cap Gas Out Fitting
11	Red Internal Light	27	Tower Cap Check Valve
12	Tower Cap to Humidifier 1 tube	28	Eye Applicator (goggles)
13	Humidifier - 2	29	Power Cable

14	Humidifier Bracket	30	Plastic Funnel
15	Humidifier- 1	31	Metal Stirring Rod
16	Spot Applicator	32	Remote Bubbling Stone

All containers and tubes provide are FOOD SAFE but NOT dishwasher/autoclave safe. Refer to paragraph 6.0 for maintenance instructions.

3.5 Assembly Instructions

Additional items required (not supplied with system unless indicated)

- Philips screwdriver
- One litre wide mouth glass measuring jug
- Stainless steel table knife (or equivalent for stirring)
- Measuring scales
- 3.5 litres of 0 TDS water
- Suitable container to measure the lye in

PPE

- Mask for your nose and mouth (respirator)
- Safety glasses
- Gloves (provided)

Step 1 Prepare Your Water

You will require approximately 3.5 litres of 0 TDS water which can be produced in a number of ways

- Filter 4 litres of water using the Osmio Zero and place in a distiller and distil for 4 hours (If distilling filtered water please ensure you follow the manufacturer's instructions and descale the distiller regularly as directed)
- Produce 3.5 litres of 0 TDS water using a reverse osmosis system fitted with a deionisation resin filter
- Buy distilled or deionised water (type 1)

Step 2 Prepare the electrolyte solution (skip this if premixed lye solution is supplied)

- Make sure your work area is well ventilated and work surface is covered
- Put on safety glasses, gloves, and mask
- Measure 80 g of lye (sodium hydroxide) into the container
- Fill the glass measuring jug with 750 ml of 0 TDS water
- Place the jug on a surface that will not be damaged by lye spills
- Slowly add the 80 g of lye to the 0 TDS water and stir until dissolved with the stainless-steel table knife (or equivalent). Do not lean over the water to avoid inhaling fumes. Fumes will irritate your throat if breathed.
- The solution will become cloudy and produce heat. It will also emit noxious fumes for a few minutes as the lye pre-conditions the water.
- Cover the solution and set aside in a well-ventilated area to cool (~ 20 mins)
- Fill Humidifier 1 and Humidifier 2 to the fill line with 0 TDS water and screw on the lids taking care not to cross thread

Lye is corrosive and should only be handled using the appropriate PPE. If the eyes are exposed, rinse thoroughly with cold water for 5 minutes. Seek immediate medical attention. Do not use the Humidifiers that come with the system to mix your lye solution as this will contaminate them and the heat emitted can melt the plastic. Do not use aluminium utensils or containers as lye dissolves aluminium.

DO NOT use POTASSIUM HYDROXIDE (Caustic potash) in the system. Potassium hydroxide is incompatible with the inner components and will cause internal damage that can lead to leaks and system failure. It will immediately cause severe chemical burns and damage if spilled. Only 99.9 % pure lye can be used to prepare the solution.

Step 3 Attach Handles and Bracket

- Using the Philips screwdriver unscrew and take off the screw on the right hand side of the system
- Place the bracket in position and screw on to the side of the system using the screw
- Unscrew the two screws at the back of the top of the system, place handle in place and screw in position using the screws

- Repeat with the two screws at the front of the top of the system, place handle in place and screw in position using the screws
- Unscrew black fill cap from the system and prepare the exposed threads by wrapping 7 - 8 rounds of polytetrafluoroethylene (PTFE) tape clockwise around the threads on the top of the system

Step 4 Filling the System

Cover the surface before pouring the lye solution into the system to prevent surface damage (in case there is a leak caused by shipping damage or accidental spillage). Before you pour the lye solution into the infinity, please flush the system with hot tap water to dissolve any residual lye crystals. All systems are tested immediately prior to the despatch, but crystallisation can occur during the shipment.

- Insert power cable at back of system and plug in
- Turn the system on so that the front display is illuminated
- Place the funnel in the top of the system
- Slowly pour in HOT tap water (approximately 65C, 1250 ml)
- Check the sight tube to see the water level in the system (do not overfill)
- Allow the water to cool before discarding from the system (down the sink)
- Place the funnel back in the top of the system
- Slowly pour the cooled lye (electrolyte) solution into the system
- Check the sight tube to see the electrolyte level within the system
- Measure another 500 ml of 0 TDS water and slowly add this to the system
- The system should not fill all the way, but this is the recommended volume for first operation

The blue LED (bottom of the sight tube) and floating sight tube ball makes it easier to see the liquid level (the ball can temporarily get stuck as detailed above). The system should be operated 80-100% full to avoid crystallisation of lye in a sight tube. The ball being stuck is inconvenient but is not a warranty issue as it does not affect the performance of the system. Do not put concentrated lye solution through the tower cap check valve.

Lye solution should only be put in the machine using the funnel provided. The tower cap should only be removed for the initial lye fill and for maintenance.

Do not overfill the system (maximum of 1250 ml on first fill). Fill to 100% "Full" mark on the second use or after 2 hours of use – whichever comes first. The high liquid level alarm will sound if the system is too full when gas production starts (due to bubbles in the solution expanding the liquid volume).

In case of an accidental overfill please see troubleshooting guide section 8 page 37.

Step 5 Attaching the Tower Cap and Humidifiers

- Screw the tower cap on to the top of the system being careful not to cross thread and tighten until sealed (do not over tighten the tower cap)
- Attach the tube (P) to the tower cap gas out fitting and to Humidifier - 1 gas input
- Attach the tube (R) to the gas output on the top of Humidifier - 1 and attach the other end to the nipple on Humidifier- 2 (the one which leads to the internal tube attached to the bubbling stone)
- Attach the cannula or spot applicator tube to the gas output on Humidifier - 2

Humidifier-1 Humidifier-2

It is normal to have some water in the tubes as the HydrOxy gas has a very high humidity and condenses in the tubes. Please click here to watch the quick start guide video

When attaching the tubes do not push the tubes too far, only push on tight enough to seal. You should only have to rock & twist the tube gently to remove it. The tower cap should only be removed when necessary and not overtightened.

3.6 Performing the Operational Check

Before using the system for the first time, take time to perform the following operational check

- Ensure the system is plugged in and switched ON
- Check that the red internal light is on (can be seen at the back of the system)
- Check that the blue sight tube illumination light is on
- Check that the fluid level is between 80% and 100%.
- Frequency is preset to 432 Hertz
- Ensure duty cycle is set to correct level for the individual using the system (see section 3.8)
- Turn on the timer (please see section 3.7 to avoid damage) ●
- Check gas is bubbling in both humidifiers

3.7 System Settings

The system has a feature that allows you to set the Frequency being pulsed to the electrolyser. Frequency is usually referred to in AC as Hertz (Hz) or in the case of DC as pulses per second (pps).

The system comes preset to 432 Hz with a duty cycle of 50% (see section 3.6 to calculate the duty cycle). The Frequency (FREQ) buttons control how many pulses per second are sent to the electrolyser. The power pulses DC electricity to the electrolyser 432 times per second (preset) and this can be varied if another frequency is required.

The system can have a mechanical or digital timer switch to control gas production. Please see sections 3.8 & 3.9 for instructions.

3.8 Mechanical Timer

Please follow these instructions to operate mechanical timer.

- The timer has to be turned clockwise past 10 minutes for the system to start producing gas
- Once set NEVER turn the timer backwards (counter-clockwise) to reduce the time or to turn off the timer or gas production, doing that will damage the timer and limit its lifespan
- Once turned on you have to allow the timer to count down and shut off by itself
- If you need to turn off gas production before the timer has finished counting down just turn off the main power switch
- For continuous function turn the timer counterclockwise one click
- To deactivate the continuous function just turn the timer switch clockwise one click
- Mechanical timer can be left on continuous function, an system can be switched On and OFF using ON/OFF button.

3.9 Digital Timer

3.10 Relative Contraindications

If you or any of your clients have the following conditions then please contact your doctor, consultant, or other health care advisor prior to starting HydrOxy gas supplementation:

- Any and all transplants and implants
- Pregnancy
- Any condition that requires daily medication

3.11 Gas Volume and Calculating the Duty Cycle

The Duty Cycle is the time during each period (pulse of FREQ) that the electricity is on and can be adjusted using the DUTY buttons. If the Duty Cycle % is set for 30 that means the electricity is on for 30% of the time and off for 70% of the time.

Since the electricity produces the gas, turning the electricity on for only 30% of the time ensures that the machine is producing only 30% of the volume of gas the machine is capable of. If the Duty Cycle is set at 100% you will get 100% of the volume the system is capable of producing (50 litres per hour). The DUTY buttons make it really easy to vary the volume of gas produced by the system.

Gas production has to be reduced appropriately when using the system for inhalation because more than 4% hydrogen in the intake breath is potentially explosive According to hydrogen gas physical properties, when mixed with air in a concentration below 4%, hydrogen gas is not explosive.

The charts on the following pages will help to calculate the safe but therapeutic breathing ratio of around 2% hydrogen in the intake breath. Please use these charts to calculate the optimal Duty Cycle. When using the following charts to calculate your recommended duty cycle consider the following:

- The ‘weight’ should be the ‘ideal body weight’, if the person is under or overweight then the weight should be adjusted accordingly before performing the calculation, where possible lung capacity should be used
- Women generally have 20% less lung capacity than men of the same weight

To calculate your safe breathing limit the following is taken into consideration:

- The Osmio Infinity makes up to 50 litres of HydrOxy gas per hour (lph) ● HydrOxy gas is two thirds (2/3 or 0.6666) hydrogen.
- People have lungs sized for their ideal body weight.

Use the examples below:

Divide body weight (if overweight/underweight use ideal body weight) in lbs by 5 e.g.

180 lbs / 5 = 36%

Or for metric

Divide body weight (if overweight/underweight use ideal body weight) in kg by 2.3

e.g. 82 kg / 2.3 = 36%

The volume of HydrOxy gas that is inhaled is not as important as the length of time it is inhaled. This is based on two factors:

1. Once the blood is saturated with hydrogen, any excess hydrogen is EXHALED. Inhaling a higher % only shortens the time it takes to saturate the blood (by a few minutes). After the blood is saturated, even a 1% mixture is sufficient to keep the blood saturated.

2. It takes time for the hydrogen in the blood to fully saturate into the body's tissues (different organs have different timings for maximum saturation). When inhalation stops, the blood loses its hydrogen content in a few minutes.

Research is showing a greater therapeutic benefit by keeping the blood saturated with hydrogen for many hours. Thus, a volume of hydrogen greater than 4% in the inhaled breath is both redundant and dangerous. A volume of even 2% over an extended time is more therapeutically beneficial and most important safe.

Estimated Duty Cycle (%) vs Gas Volume Production (l/hr and ml/m) Chart											
%	l/hr	ml/m	%	l/hr	ml/m	%	l/hr	ml/m	%	l/hr	ml/m
1	0.5	8	26	13.0	216	51	25.5	425	76	38.0	633
2	1.0	16	27	13.5	225	52	26.0	433	77	38.5	641
3	1.5	25	28	14.0	233	53	26.5	441	78	39.0	650
4	2.0	33	29	14.5	241	54	27.0	450	79	39.5	658
5	2.5	41	30	15.0	250	55	27.5	458	80	40.0	666
6	3.0	50	31	15.5	258	56	28.0	466	81	40.5	675
7	3.5	58	32	16.0	266	57	28.5	475	82	41.0	683
8	4.0	66	33	16.5	275	58	29.0	483	83	41.5	691
9	4.5	75	34	17.0	283	59	29.5	491	84	42.0	700
10	5.0	83	35	17.5	291	60	30.0	500	85	42.5	708
11	5.5	91	36	18.0	300	61	30.5	508	86	43.0	716
12	6.0	100	37	18.5	308	62	31.0	516	87	43.5	725
13	6.5	108	38	19.0	316	63	31.5	525	88	44.0	733
14	7.0	116	39	19.5	325	64	32.0	533	89	44.5	741
15	7.5	125	40	20.0	333	65	32.5	541	90	45.0	750
16	8.0	133	41	20.5	341	66	33.0	550	91	45.5	758
17	8.5	141	42	21.0	350	67	33.5	558	92	46.0	766

18	9.0	150	43	21.5	358	68	34.0	566	93	46.5	775
19	9.5	158	44	22.0	366	69	34.5	575	94	47.0	783
20	10.0	166	45	22.5	375	70	35.0	583	95	47.5	791
21	10.5	175	46	23.0	383	71	35.5	591	96	48.0	800
22	11.0	183	47	23.5	391	72	36.0	600	97	48.5	808
23	11.5	191	48	24.0	400	73	36.0	608	98	49.0	816
24	12.0	200	49	24.5	408	74	37.0	616	99	49.5	825
25	12.5	208	50	25.0	416	75	37.5	625	100	50.0	833

Estimated Weight vs Duty Cycle (%) vs Gas Volume Chart for 2% Inhalation

Kg	lbs	%	L/Hr	mL/m	Kg	lbs	%	L/Hr	mL/m
2.3	5	1	0.5	8	59.0	130	26	13.0	216
4.6	10	2	1.0	16	61.2	135	27	13.5	225
6.8	15	3	1.5	25	63.5	140	28	14.0	233
9.0	20	4	2.0	33	65.8	145	29	14.5	241
11.3	25	5	2.5	41	68.0	150	30	15.0	250
13.6	30	6	3.0	50	70.3	155	31	15.5	258
15.9	35	7	3.5	58	72.6	160	32	16.0	266
18.1	40	8	4.0	66	74.8	165	33	16.5	275
20.4	45	9	4.5	75	77.1	170	34	17.0	283
22.7	50	10	5.0	83	79.4	175	35	17.5	291
25.0	55	11	5.5	91	81.6	180	36	18.0	300

27.2	60	12	6.0	100	83.9	185	37	18.5	308
30.0	65	13	6.5	108	86.2	190	38	19.0	316
31.8	70	14	7.0	116	88.5	195	39	19.5	325
34.0	75	15	7.5	125	90.7	200	40	20.0	333
36.3	80	16	8.0	133	93.0	205	41	20.5	341
38.6	85	17	8.5	141	95.3	210	42	21.0	350
40.8	90	18	9.0	150	97.5	215	43	21.5	358
43.0	95	19	9.5	158	99.8	220	44	22.0	366
45.4	100	20	10.0	116	102.0	225	45	22.5	375
47.6	105	21	10.5	175	104.3	230	46	23.0	383
49.9	110	22	11.0	183	106.6	235	47	23.5	391
52.1	115	23	11.5	191	108.6	240	48	24.0	400
54.4	120	24	12.0	200	111.1	245	49	24.5	408
56.7	125	25	12.5	208	113.4	250	50	25.0	416

A more accurate way to determine the correct (personally optimised) setting is:

- Measure the volume of air you breathe in a single breath in lph at rest (tidal breath)
- Count the seconds it takes for several inhalations and find the average (when at rest)
- Multiply tidal breath ml by safe hydrogen 2%
- Divide by inhalation seconds to get the ml/sec of safe hydrogen
- Then multiply this by 60 to get a safe ml/m hydrogen
- Divide by 0.6666 to get HydrOxy volume that gives 2% hydrogen inhalation ● Multiply by 60 to get ml/hr

Example

- Adult male
- 220 lbs
- Ideal weight 180 lbs
- Breathing 0.5 litres (500 ml) of air every 3 seconds

500 ml x 0.02 = 10 ml
10 ÷ 3 x 60 = 200 ml/m
200 ÷ 0.6666 = 300 ml/m
300 x 60 = 18,000 ml/hr (18 l/hr)

For this example, a 2% safe breathing limit of HydrOxy is 18 lph (this is equal to 12 lph of hydrogen). Therefore, you would set the duty cycle to 36%.

For all other applications set the DUTY % to 100% (except for breathing). Adjusting the Duty Cycle % adjusts the volume of gas produced by the system. 0% is zero gas volume production and 100% is 100% gas volume production (~50 litres per hour)

Ensure the correct duty cycle is set for each individual user. Do not exceed the recommended duty cycle for ideal weight.

4.0 Operating the System

Hydroxy gas can be inhaled through a nasal cannula or used topically for localised body ailments. Gas can also be bubbled in a foot bath or bathtub using the additional tubing and bubbling stone.

4.1 Operating the System - Inhalation

1. Turn on the system
2. Discharge any static charge by touching the system case
3. Check the liquid level is between 80% and 100%
4. Top up the system with liquid from Humidifier - 1 through the check valve using the syringe provided as required
5. To top up the water level first hold the lid of Humidifier-1 and unscrew the tank
6. Allow the lid of Humidifier - 1 tank to rest on the bracket at the side of the system (or loosely on top of the Humidifier)
7. Use the syringe to draw up 50 ml of water
8. Syringe the water into the system through the check valve
9. Check the water level in the sight tube and continue to fill to a level between low and full, taking care not to overfill (it takes a few seconds for the level to change in the sight tube)
10. Change the water in Humidifier – 1 (if at 5 hours use) or refill Humidifier 1 with 0 TDS/Distilled water to fill line 11. Check the TDS of Humidifier – 2 (replace with 0 TDS/Distilled water every 2 hours of use)
12. Set DUTY to correct setting for the individual
13. Attach cannula to Humidifier - 2 gas out
14. Put the cannula on
15. See instructions in sections 3.8 and 3.9 for timer operation

Never breathe gas that has not gone through BOTH Humidifiers which have been filled to the respective fill lines. Always replace the water in the Humidifiers with 0 TDS/Distilled water.

4.2 Topical application

1. Turn on the system
2. Discharge any static charge by touching the system case
3. Check the liquid level is not low
4. Top up the system with liquid from Humidifier 1 through the check valve using the syringe provided if required
5. To top up the water level first hold the lid of Humidifier-1 and unscrew the tank
6. Allow the lid of Humidifier - 1 tank to rest on the bracket at the side of the system (or loosely on top of the Humidifier)
7. Use the syringe to draw up 50 ml of water
8. Syringe the water into the system through the check valve
9. Check the water level in the sight tube and continue to fill to a level between low and full, taking care not to overfill (it takes a few seconds for the level to change in the sight tube)
10. Set DUTY to 100%
11. Insert the long clear tube into the Spot Applicator funnel
12. Insert the other end of the Spot Applicator tube into the gas output fitting of Humidifier - 2 (push the tube on)
13. Place the Spot Applicator funnel over the chosen area of your body
14. See instructions in sections 3.8 and 3.9 for timer operation

4.3 Drinking Water

If the water in Humidifier - 2 is being used for drinking, then the water in this humidifier must be changed every hour. The TDS of the water in Humidifier 2 must be measured before consumption. This water can only be consumed if the TDS is ≤ 1.

4.4 Shutting the System Off

When you are finished using the system turn off at the main power switch. It is safe to leave the system plugged in when not producing gas.

Only water from Humidifier 2 can be consumed if the TDS is ≤ 1. Never leave the system running (producing gas) when not in use

5.0 Emergency Situations

In case there is any abnormal situation during the operation, such as fluids spilling on or inside the system:

- Switch off the system
- Unplug the system immediately from the power supply
- Contact Osmio Solutions Ltd

6.0 Maintenance

The system requires regular and preventative maintenance to prevent damage to the system and ensure the safety of the users, please contact Osmio Solutions Ltd for assistance if necessary. This section contains an outline of the points mentioned in the checklist below.

General Maintenance checklist				
Item	5 hrs of use	Daily	100 hrs or every 2 months	500 hrs or every 12 months
Keep the system free of dust		x		
Change water in Humidifier - 1 every	x			
Change water in Humidifier - 2		x		
100 hours flush			x	
Return system for maintenance every 500 hrs or every 12 months				x
Maintain a system log		x		
Top up System Liquid Level if required	x			

6.1 Maintenance in the Home

Maintenance Checklist - Home Setting	
Daily (or after each user)	
Visual Checks	Check all parts are present and securely fitted (do not overtighten)
	Check the fluid levels (System, Humidifier - 1 and Humidifier - 2) topping up levels where necessary
	Clean and disinfect breathing cannula, humidifiers and tubing, see section 6.2 for instructions
	Inspect the power cable and do not use the system if the power cord or plug is loose, dirty, or damaged (danger of electrocution/fire)
	Check the system before use (bubbling should be visible in both humidifiers)
Weekly	
Cleaning	Switch off, unplug and clean the outside of the system with a suitable disposable disinfectant wipe (or microfibre/damp cloth), allowing the unit to dry before use
Visual Checks	Check the tubing (all tubing must be transparent without kink, visual blockage/contamination)
	Check the timer at the back of the machine (service every 100 hours and return for maintenance every 500 hours)

6.2 Cleaning Nasal Cannula and Tubing (home use)

6.2.1 Cleaning cannula and tubing

Nasal cannulas and tubing require to be cleaned after each use (or daily if system used several times a day).

To sanitise using Osmio Sanser 300 mg/l solution

1. Prepare 0.5 litre of solution (10 min cycle) see manual for instructions.
2. Leave your cannula in this solution for 5 minutes.
3. Rinse the nasal cannula thoroughly, shake off water and hang it up to dry.
4. Allow the cannula to dry completely before use.

Hypertonic solution can be used to clean cannula and tubing. Dissolve 1 teaspoon of salt and ½ teaspoon of baking soda in 1L of cooled boiled water. Allow 30 minutes contact time.

If you are using any other sanitising solution, please refer to manufacturer for contact time and safety instructions.

If you have been unwell, please replace the cannula with a new one. Each user should have their own cannula.

6.2.2 Cleaning Humidifier and bubbler

To sanitise using Osmio Sanser 300 mg/l solution

1. Prepare 0.5 litre of solution (10 min cycle) see manual for instructions.
2. Rinse bubbler and humidifier with soapy water
3. Divide solution between bubbler and humidifier, screw on lids and shake well
4. Leave for 5 minutes, rinse thoroughly,
5. Refill with 0TDS water

Hypertonic solution can be used to clean bubbler and humidifier. Dissolve 1 teaspoon of salt and ½ teaspoon of baking soda in 1L of cooled boiled water. Allow 30 minutes contact time. Remove bubbling stone from the bubbler if using this method.

6.3 Maintenance in a Clinical Setting

The system and tubing will require regular disinfection in a clinical setting. Please liaise with your infection control and risk management staff to ensure that disinfection is carried out regularly and documented. Single use tubing/cannulas are recommended.

Please follow local clinical infection control policies and procedures when disinfecting the system (see Appendix A for maintenance log).

Maintenance Checklist - Clinical Setting	
Daily or after every patient	
Cleaning	Wipe dust from the system when not in operation
	Cannulas should be utilised according to local clinical policy
	Disinfect the humidifiers and replace the water (use 0 TDS water)
Visual Checks	Check all parts are present and securely fitted (do not overtighten), inspect the power cable and do not use the system if the power cord or plug is loose, dirty, or damaged (danger of electrocution/fire)
	Disinfect/ replace the tubing (all tubing must be transparent without visual blockage/contamination)
	Check the fluid levels before each use (System, Humidifier - 1 and Humidifier - 2) topping up levels where necessary
Function Check	Check the system before use (bubbling should be visible in both humidifiers)
Weekly	

Cleaning	Switch off, unplug, and clean the outside of the system with a suitable disinfectant, allowing the unit to dry before use
	Disinfect the tubing (see section 8.1)
Visual Check	Check the timer at the back of the machine (service every 100 hours and return for maintenance every 500 hours)
	Check the tubing. All tubing must be transparent without visual blockage or contamination.

6.4 Changing the Humidifier Water

- Only use 0 TDS/Distilled water in both Humidifiers
- Replace the water in Humidifier
- Wash and sanitise Humidifier as per 6.2 or 6.3
- If the internal liquid level is below maxim use the water from Humidifier - 1 to refill the system with the syringe provided
- Replace the water in Humidifier if TDS
- Wash Humidifier - 2 as per 6.2 or 6.3
- Check the TDS of the water in Humidifier - 2 before each inhalation session and replace if TDS is ≥ 2
- Only consume water if the TDS ≤ 1

Do not use Humidifier - 1 water for drinking or feeding plants, animals etc. as its function is to absorb any residual electrolyte

6.5 Topping up the Liquid Level

When the liquid level becomes low you will need to top up the system with either 0 TDS water/distilled water or water drawn from Humidifier – 1. You do not need to add any additional lye to the water. If you let the liquid level get too low the red low liquid level light will come on, the alarm will sound, and the system will stop gas production. Fill the system through the check valve on the top of the tower cap using the syringe provided. Do not unscrew the Tower Cap when refilling to prevent stressing the plastic threads.

- Do not ever plug or cap the check valve(refill valve in the tower) or it will not be able to mitigate the electrolyser vacuum
- Tilt system back and forward to check if the ball in sight tube is moving
- Have the syringe plunger partially pulled out to allow you to push it in just before use (this allows you to break the 'seal' that occurs when the rubber sticks to the plastic when stored)
- Hold the Tower Cap to prevent any backsplash
- Syringe the water slowly into the check valve on the tower cap to prevent backsplash
- It may take up to 30 seconds for the liquid to fully fill the sight tube even if the system is full. Tilt the system forward to speed up the levelling.
- Do not overfill

You can run the system while filling water through the check valve. Sometimes the water does not go down into the electrolyser immediately when you are syringing it into the tower, causing it to look like the machine is overfilled. If this happens, stop filling, and run the machine. As gas travels up into the tower, it will cause the water to drop to the level it is supposed to be at.

The system has around 10 hours of run time between full and low (assuming 100% gas production). Top up the infinity with water from Humidifier - 1 when needed.

Running electrolysers out of water may cause internal overheating, explosions and the resulting dry lye can plug orifices with lye crystals which will damage the system. The system is designed to shut off gas production and alarm if the water level is low.

6.6 Servicing the System Every 100 hours

1. Remove tubing from Tower Cap
2. Remove Humidifier - 1 from the bracket
3. Remove the tower cap from the top of the system
4. Use towels as padding to prevent damage to the system and to catch any lye drips (lye may damage paint)
5. Place a suitable wide mouthed container or jug that will hold at least 2 litres of electrolyte solution in the sink
6. Turn the system upside down over the suitable container and allow the electrolyte (lye) solution to empty from the system
7. Leave the system upside down for a few minutes to allow the internal tanks to fully drain
8. Immediately clean up any spilled lye with lots of water until the 'slippery' feeling is gone
9. Rinse the system with hot clean water 3 - 4 times
10. Using the funnel refill the system with the lye solution (discard any sediment)
11. Refit the Tower Cap to the top of the system
12. Replace Humidifier - 1 in the bracket
13. Re-attach tubing to Tower Cap and Humidifier - 1
14. Update the Maintenance Log

6.7 How to Pack for 500 hour Service

Every 500 hours of use the system requires an engineering inspection and service. Please contact Osmio Solutions to arrange this.

1. Remove tubing from Tower Cap
2. Empty and remove Humidifier - 1 from the bracket
3. Remove the tower cap from the top of the system
4. Use towels as padding to prevent damage to the system ant to catch any lye drips (lye may damage paint)
5. Place a suitable wide mouthed container or jug that will hold at least 2 litres of electrolyte solution in the sink
6. Turn the system upside down over the suitable container and allow the electrolyte (lye) solution to empty from the system into the jug
7. Leave the system upside down for a few minutes to allow the internal tanks to fully drain

8. Immediately clean up any spilled lye with lots of water until the 'slippery' feeling is gone
9. Once fully drained sit upright and refit the black top cap to the top of the system
10. Store the electrolyte solution (lye) in a suitable marked container (e.g. glass jars with screw top lids) and store in a safe place
11. Remove handles and replace screws back on to the system
12. Remove the Humidifier Bracket and replace screw back on to the system
13. Use the original packaging for shipping
14. Enclose a dated and signed Maintenance Log
15. Indicate any faults on a separate sheet of paper

6.8 Preparing for Storage and Transportation

For short shutdowns (less than one month) you can leave the lye solution in the system, just make sure all the outputs are sealed. The biggest issue with storage is lye crystallisation. Crystallisation can plug orifices, make the floating ball stick to the sight tube, and cause internal shorts. Crystallisation occurs when the water leaves the system via evaporation so short-term storage is fine as long as all outputs are sealed.

The system can be transported anywhere by cart or vehicle as long as it is securely fastened upright and unable to tip over. The system is not designed to operate at an angle greater than 5 degrees (or to be tipped over).

For longer storage or for shipping, drain and prepare the system (see section 6.6). Never store the system long term or ship with fluids inside.

7.0 Product Specifications

Osmio Solutions Ltd reserves the right to change any specifications without prior notice as part of our continuous product development program.

7.1 General specifications

General Specifications	
Overall Dimensions	215mm wide x 320mm deep x 270mm high
Weight	~ 6 kg (empty)
Operating Conditions	5°C to 40°C
Mains Power Supply	220 - 240 Volts
Gas Output	0 - 50 litres per hour
Supply Frequency Range	50 - 60 Hertz
Power Drawn	300 Watts (at 100% Duty Cycle)

7.2 System Specifications

CE safety declared
Built to CSA/UL and Australian safety standards
Master power switch (total shut off)
Easy to use timer switch
Continuous run operation
Electronically adjustable gas volume output (DUTY 1% to 100%)
Set desired frequency 1Hz to 150KHz (suggested FREQ 432)
Gas production (green LED indicator)
Operates at very low pressure (for safety)
Automatic electrical high-pressure gas production shutoff (~2 psi)
Mechanical pressure relief valve ~3 psi (if electrical shut off fails)
Automatic high and low level liquid level shut off
Red LEDs and audible indicator for high and low liquid level
Illuminated (blue LED) liquid level sight tube with floating level indicator
Reliable anti-backfill system (prevents overfilling from Humidifier)
Tower cap (to pre-separate lye mist from the Hydroxy Gas and to see any foaming/ contamination issue)
Humidifier (with bracket) to scrub the residual lye from the Hydroxy gas
Hour Meter on the rear of system (return for maintenance every 500 hours)
Designed for 24/7 continuous operation with minimal maintenance
Additional capacity reservoir (1200 ml) for longer run time between fillings

8.0 Troubleshooting Guide

Most issues with the Osmio Infinity can be resolved by the user. There are few mechanical (manufacturer) issues with the system because each one is thoroughly tested before being shipped and is designed for a 20 year service life. Issues with the system can generally be resolved by ensuring the machine is set up properly. Please see the following table for troubleshooting guidance.

Troubleshooting	
Water or other liquid has been spilled over the system.	Switch off at the mains and unplug the system as there is a danger of electrocution, damage to the machine or fire. Contact Osmio solutions immediately to arrange for return for inspection and repair.
Leaks at the bottom of the system	Contact Osmio Solutions immediately.
Alarm sounding and red overfull light is on	This is a safety feature and happens when you have accidentally overfilled the system. Turn off the infinity and remove the power cord from the back of the unit. Remove all the tubes and the humidifier. Unscrew the tower cap. Place a glass container in the sink and slowly pour out a little lye solution from the system. Set the machine upright and wait for 30 seconds. If the liquid level is still above the full mark, then repeat as above until the liquid level returns to below the full mark. We recommend saving the excess lye solution that was poured out (keep in a marked resealable jar or container) and use it the next time the system requires liquid. Lye is safe for the environment and you can dispose of it down the drain if necessary.

Red low level light is on and alarm is sounding	The liquid level is too low, top it up with the water from Humidifier - 1 and ensure Humidifier - 1 is topped back up to the fill line with 0 TDS/distilled water before use.

There are liquid droplets inside the Tower Cap	The purpose of the Tower Cap is to allow mist (containing lye) to separate from the gas. You will see liquid droplets condense on the inside of the Tower and that is the only 'water' you should ever see.
There is water in the Tower Cap	Filling the tower cap too fast can create a gas lock at the bottom of the Tower Cap. If you are filling the system and the water level is still low but water is seen in the Tower Cap, stop filling the machine and start gas production. The gas being produced will disturb the water in the Tower Cap and the water will flow back into the system. You will then see the water level in the system rise
No light on the main power switch	Check the machine is properly plugged in. Check the power cord is firmly attached to the back of the system. If the power switch is still not lighting up, then replace the 10 AMP fuse (do not fit a higher rated fuse). If after completing all these actions the issue is not resolved, then contact Osmio Solutions.
The green gas production light comes on but does not stay on	You have a blockage in your gas tubing. Find the blockage (this may be due to a kink in the tubing or a plugged bubbling stone).
The green gas production light is flickering rapidly on and off	You may have a partially clogged gas tube(s) or require a pressure switch rest. Check for plugged tubes or bubbling stone. Contact us for un-plugging instructions. If the tubing is all clear contact us for assistance to reset the pressure switch.

The green gas production light comes on and stays on, but you have low or no gas being produced in the Humidifiers	There are two causes: A Not enough gas production B A gas leak With the system running, first check to see if the system is producing gas, remove the tower cap and look down the stem with a torch to confirm bubble production. If the system is not at the correct level, you will not be able to see if there are any bubbles (gas) coming out of the white plastic block inside. The fluid level should be ~¼" (6mm) above the white plastic block inside. If it is not, then fill it to this level (no fuller).
	With the power on and the timer running check for bubbles. If there are a lot of bubbles then gas is being produced. First visually inspect all tube connections and container lids, securing any that are loose. Then check all areas using a soapy water solution. Put a generous squirt of washing up liquid into 125 ml of water and using a small brush apply the solution over any joints or areas where the gas could leak (tower cap threads, tube connections, lids, fittings, seals etc.). When the soap film covers the leak, you will see tiny bubbles forming at the leak. Once the leak has been found please secure any loose connections and if this does not resolve the issue then contact us for a solution. If there are few, occasional or no bubbles then this can indicate that there is not enough lye in your solution. Empty and rinse the system, prepare a new lye solution, and slowly fill with the new lye solution (following the steps in the manual).
Foam in the Tower Cap	Impurities (like oils) cause the foaming, it means the electrolyte has become contaminated and needs to be replaced. Stop the system and completely clean it by following the instructions for the 100 hour service please make sure that you prepare a new batch of electrolyte to fill the system with.

Tower Cap is leaking gas or fluid	This means Tower cap is not properly sealied. Wrap a cloth around the tower cap and unscrew it. Place several wraps of PTFE tape clockwise on to the threads. Gently screw the tower cap back on ensuring not to overtighten.

Please do not remove the case of the Osmio Infinity unless specifically instructed to do so. There are no serviceable parts inside and there is danger of electrical shock. The system can be damaged if the casing is opened or closed incorrectly. Opening the case voids all warranties.

9.0 Glossary of Terms

Disinfection - The destruction of pathogenic bacteria, usually with an antiseptic chemical or disinfectant.

Gas Production Volume - Gas volume and gas pressure are interrelated, but they are two different things and often get confused. Volume is how much gas there is present, and pressure is how much force exerted by the gas. Volume is measured in litres per hour (lph) or millilitres per minute (ml/m).

Pressure - When liquid water is turned into HydrOxy gas it tries to expand about 1800 times. If the gas is 'contained' in a container (like the electrolyser tank) and cannot expand, then the pressure will automatically rise. This is how the system creates its own pressure needed to push the gas out.

Appendix A - Medical Disclaimer

The products discussed/presented are not intended to diagnose, treat, cure, or prevent any disease. If you are pregnant, nursing, taking medication or have a medical condition please consult your physician before using the product.

The information provided in this manual is for informational purpose only and is not intended as a substitute for advice from your physician or any other health care professional, or any information contained on or in any product label or packaging.

You should not use the information in our literature or on our website for diagnosis or treatment of any health problem, for prescription of any medication or other treatment. Always consult with a healthcare professional before starting any diet, exercise, or supplementation program, before taking any medication, or if you have or suspect you might have a health problem.

You should not stop taking any medication without first consulting your physician. Even though we use only natural ingredients, always check with our doctor for risks associated with dietary supplements and how they relate to your specific health conditions and/or allergies. The Osmio Infinity is not yet defined as a medical device.

Appendix B - System maintenance log

DATE	HOURS	SIGNATURE PRINT AND SIGN
	100	
	200	
	300	
	400	
	500	RETURN SYSTEM FOR MAINTENANCE
	600	
	700	
	800	
	900	
	1000	RETURN SYSTEM FOR MAINTENANCE
	1100	
	1200	
	1300	
	1400	
	1500	RETURN SYSTEM FOR MAINTENANCE
	1600	
	1700	
	1800	
	1900	
	2000	RETURN SYSTEM FOR MAINTENANCE

DATE	HOURS	SIGNATURE PRINT AND SIGN

☐ Turn on the system

☐ Discharge any static electrical charge by touching the system case

☐ Check the liquid level is not too low

☐ Top up liquid from Humidifier 1 if required

☐ Refill Humidifier 1 with 0 TDS water to fill line (if liquid level was topped up)

☐ Check the TDS of the water in Humidifier - 2 and replace if TDS is ≥ 2

☐ Set DUTY to correct setting for the individual

☐ Attach cannula/spot applicator/bubbling stone to Humidifier 2 gas out

☐ Put the cannula on/attach spot applicator

☐ Turn on timer clockwise to the required time (10, 20, 30 or 60 minutes)

☐ For continuous operation turn counter clockwise one click

☐ To stop continuous operation turn clockwise one click

Appendix D - Frequently Asked Questions

If I have the tower cap in place, do I still need to use the Humidifier?

YES. The tower cap is needed to pre-filter the lye as it allows the lye mist to separate from the gas. The gas needs to pass through both Humidifiers before inhalation therefore both Humidifiers are still required to carry out the final scrubbing.

Can the Tower gas be directly inhaled?

NO. NEVER breathe the HydrOxy gas or use it for any other health purpose unless it has first gone through both Humidifiers.

Do I need to keep touching the metal casing while I am using the Osmio Infinity?

Not unless you do something that will generate static electricity, like stroking a pet or shuffling across the carpet. Once you are 'grounded' you have equalised your electrical potential with the Osmio Infinity and there will not be a spark if you touch the parts. Note that a high humidity environment also helps mitigate static electricity.

How long does it take to 'charge' a litre (quart) of water?

Bubble the water for 10 minutes per litre of water. A gallon of water would take about 40 minutes to fully charge (assuming 50 lph of HydrOxy flow).

How long does the water 'hold' its charge?

The half-life of the HydrOxy bubbled water is 12 hours (half-life = 12 hours). This is assuming that the water is kept at room temperature and in sealed 'water bottles'. You can bubble enough water in the morning for your daily use.

Can I 'use' HydrOxy every day?

Yes. You can use the system on a daily basis as long as you are compliant with the duty cycle recommendations.

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