# Setting up + Maintenance + Trouble Shooting

## Is the setting up easy?

If you want to get up and running as quickly as possible, the instruction booklet that comes with the machine will allow you to do this. We also have a PDF version of this on our website.

Although this covers all the essentials, we found that a lot of customers were contacting us with questions, so we created our own setting up video

The video is conversational in style and designed to gently talk you through the setting up process, whilst passing on important information that answers most people’s questions.

If you want to have a more thorough setting up process that goes into a bit more detail, then the video is the way to go

The video is around 55 minutes long, which might seem a lot but many people have commented that it has been very helpful in making the setting up process simple and understandable, whilst also addressing most of the questions likely to be asked

# Everything you need to know about Water

## What type of water

The water that needs to be used in our machines is **distilled** or **de-ionised** water

## Why water purity is so important

The water that you put into your machine directly affects its **performance** and **lifespan**.

**At H2=E we make no apologies for taking every opportunity to reinforce this message.**

The ideal water for use in a hydrogen/oxygen machine is one in which there are no **minerals**, **impurities** or **additives** such as chlorine and fluoride.

These substances can:

- Cause **scale** and **deposits** that reduce efficiency and shorten the lifespan of the machine
- Increase electrical **resistance**, forcing the machine to work harder**.**
- Cause **corrosion** which further reduces the machines lifespan.
- Contaminate the gas output, lowering **purity** and **safety**.

This is why only distilled or de-ionised water should ever be used.

## What is TDS

TDS stands for **Total Dissolved Solids**, which refers to the combined content of all inorganic and organic substances present in water in a dissolved form.

These substances can include **minerals**, **salts**, **metals**, **cations** and **anions** that are either naturally occurring or introduced into the water at some point.

**TDS is often used as an indicator of <u>water purity</u>.**

We supply a TDS reader with all of our machines so that customers can check the quality of the water before they add it to their device.

The machine also has its own built in TDS reader which allows it to monitor water quality, however, it is not as sensitive as the reader that we supply.

Because the machine has its own ability to monitor water quality, it will **prevent operation** if the water purity **drops** below the threshold required to prevent damaging the machine.

# Not all distilled or de-ionised water will be pure enough

The ideal water purity that we recommend has a **TDS** reading of **0** or **1 ppm**

Not all distilled or de-ionised water will have a purity good enough to use in your machine, which is why we provide a **TDS reader**.

It is important to always test the water before putting it into your machine in order to ensure that it is of **suitable quality**.

Genuine distilled water could have a TDS reading of up to **10 ppm**

We have found several examples where the TDS reading was the same as **tap water**, indicating that it was **not genuine** distilled water.

The machine will accept water with a TDS reading of up to **3** to **4 ppm**, however this does not mean that it is good for your machine.

Our hydrogen/oxygen machines will indicate that the water needs to be topped up when the level drops to **1 litre** (1000ml)

If you were to top up the machine with **poor quality** water, it would **mix** with the water already in the tank and could operate for a while before indicating that the purity was not good enough.

The problem with this is that by the time the machine indicates that there is a problem, a lot of **impurity** has already **contaminated** the hydrolysis cell (where the hydrogen is made) and it can be a time consuming process to clear it out.

**The message that we want everyone to remember is that the purity of the water you put into your machine is of paramount importance.**

**It is the most important thing that you can do to ensure trouble free operation as well as extending the lifespan of your machine.**

# How to Use a TDS Reader Correctly

A **TDS** (Total Dissolved Solids) reader is an essential tool for checking water **purity** before adding it to your hydrogen/oxygen machine.

Even though it's straightforward to use, there are a few important details that ensure you get accurate readings:

## 1. Prepare the Glass or Container

- Always use a clean glass or beaker.
- Any residue, soap or mineral deposits can give a falsely high reading.
- Rinse with the same distilled water you are testing before taking a measurement.

## 2. Keep the Reader Clean

- Ensure the probe tip of the TDS reader is free from residue.
- Wipe with a clean tissue and, if needed, rinse with pure water before and after use.
- Avoid touching the sensor with your fingers, as oils or salts from skin can contaminate results.

## 3. Take the Measurement

- Turn the reader on and insert the probe into the water sample.
- Make sure the probe is fully submerged but not touching the sides or bottom of the container.
- Wait a few seconds until the reading stabilises.
- Distilled water should read very low (typically under 10 ppm).
- The ideal reading for machine usage is 0 to 1 ppm

## 5. Store Correctly

- After testing, dry the probe gently and store the reader with the cap on.
- Avoid leaving the probe wet, which can cause mineral build-up or corrosion.

# Do’s and Don’ts for Filling Your Machine with Distilled Water

## Avoiding contamination

### Do’s

- Wash your hands before handling bottles, funnels or caps.
- Use a clean glass or jug that has only been rinsed with distilled water.
- Keep bottle and machine caps clean, place them face up on a clean surface while pouring.
- Pour slowly and carefully to avoid spills or contact with unclean surfaces.
- Seal the bottle and machine immediately after pouring to prevent dust or airborne contamination.
- Store distilled water bottles in a cool, dry place away from direct sunlight.

### Don’ts

- Don’t touch the inside of the cap, jug or funnel with your fingers.
- Don’t use kitchen glasses, mugs or jugs that may have soap, limescale or mineral residue – rinse them with distilled water before use
- Don’t top up the machine with partially used or water that has been left exposed.
- Don’t store distilled water near strong-smelling substances (such as cleaning products), as vapours can transfer.
- Don’t pour unused water back into the distilled water bottle/container.

## Why Owning Your Own Distiller is the Best Choice

The quality of water you put into your hydrogen/oxygen machine is essential for performance and longevity.

While shop-bought distilled water can sometimes be suitable, the purity can vary depending on storage and handling.

By purchasing your own home water distiller, you ensure a consistent supply of fresh, high-purity water.

### The advantages of making your own water include:

- Being able to store the water in glass rather than plastic bottles
- No risk of contamination from transport or storage.
- Consistent quality
- Always having distilled water available when you need it.
- It is cheaper than buying bottled water.

With high quality distilled water you know that your hydrogen/oxygen machine is protected from scale, residue and premature wear.

## Choosing a Water Distiller

When selecting a distiller, here are a few points to consider:

- **Basic models are usually sufficient**. In most cases, a straightforward, no-frills distiller produces water that is just as pure as more expensive models. Paying more doesn't necessarily mean better quality water.
- **You can double distill**. If for any reason your distiller does not produce 0 or 1 ppm water, you can distill it a second time to produce the desired water purity
- **Avoid multi-function units**. Some machines combine distilling with other functions (such as filtration or mineral adjustments). In our experience, we have noticed that these machines often don't perform as well as the dedicated distillers.
- **Capacity.** A standard 4-litre distiller is sufficient for most home users.

By keeping things simple and choosing a basic, well-made distiller, you'll get reliable results without unnecessary complications.

## Primary Functions of the Humidifier Bottles

- **Humidification**: The main role is to moisturize the gas before it is inhaled. Dry gas (especially pure hydrogen or hydrogen/oxygen) can irritate the respiratory tract if not humidified.
- **Backflow Prevention**: The water in the bottle creates a physical barrier that can prevent liquid or gas backflow into the machine.
- **Bubbling Visual Indicator**: When the machine is running correctly, bubbling in the bottles confirms gas is flowing.
- **Safety Pressure Buffer** (minor role): The water provides a modest buffer against pressure spikes

## When to top up the Humidifier bottles

We suggest topping up the bottles with **distilled water** as needed. With long sessions you may need to top the bottles up after each session.

## What is the ideal water level in the Humidifier bottles

The ideal level is the **mid-point** between maximum and minimum indicators on the bottle.

## Why and when should I replace the water in the humidifier bottles?

Over time dissolved solids can gradually **build up** in the humidifier bottles, which can be tested with your TDS reader.

In order to keep the water clean, we generally suggest that you completely **change the water** in the humidifier bottles after every **4 weeks** of use.

When changing the water we also suggest that you give them a **wash** as mineral **residues** and **contaminants** can cling to the inside of the humidifier bottles.

## How should I clean the humidifier bottles?

- Wash with mild soapy water (a gentle, fragrance-free dishwashing liquid works well). Use a soft brush, sponge or cloth to remove any film or residue.
- Avoid using anything that is abrasive in the cleaning of the bottles
- Do not clean in a dish washer
- Rinse thoroughly with clean tap water to remove all soap.
- Finally rinse with distilled water to remove any minerals present in the tap water
- Refill with fresh distilled water and reattach to your machine

## Why won’t the machine operate if I’ve added too much water?

This is a safety feature that protects the equipment and also optimises gas output

Overfilling causes the following problems:

- **Disrupted oxygen flow** – The main tank needs a small air space where oxygen can accumulate before being channelled out. If the tank is too full, there isn’t enough space for this, which reduces oxygen pressure and flow.
- **Risk of water carry-over** – Excess water can be pushed into the gas lines or humidifier bottles, which affects performance and safety.
- **Protection of the electrolysis chamber** – Too much water can flood the chamber and interfere with gas production.

## Why it’s a good idea to periodically flush the water tank

Even when using distilled water, the main water tank should be flushed from time to time, which will help to

- Maintain water quality and hygiene.
- Protect the electrolysis cell from deposits and scale.
- Ensure stable hydrogen and oxygen output.

When your machine indicates that it needs topping up with more water, it still has 1 litre still in the tank.

Just because you keep topping up the machine with clean water when required will not mean you should neglect to periodically flush the tank.

Over time, two things can happen if the water is not refreshed:

- **Residue buildup** – Small amounts of dissolved solids or airborne particles may collect in the tank which can impact the electrolysis chamber where the hydrogen is made, causing reduces performance and shortening the lifespan of the machine
- **Microbial growth** – If water sits for too long, it may allow bacteria or other microorganisms to begin growing, especially in warmer environments.

## When to Flush the tank

As a general guide once every **3 months**, but could be sooner if the machine is being used intensely – for example 2 to 4 hours every day

### Also flush the tank if:

- If the TDS reader on the machine indicates **poor water quality** (anything that is not indicated as green)
- If the machine switches off due to **overheating** and needing to cool down
- The machines '**Change Water**' icon indicates

## How to flush the main tank?

1. **Turn off** and unplug the machine before starting.
2. **Drain the tank completely**. You can test the water that you have drained with your TDS reader to assess how clean the inside of the tank has been maintained.
3. **Rinse the tank with clean distilled water** – You do not need to fill the tank all the way to the top. Fill the tank to half way, then gently swish or rock the machine so that the water can wash over the tank walls to loosen any residue.
4. **Drain the water out of the tank**
5. **Repeat a second time if required** – If when you initially drained the tank the TDS reading of that water was not **0** or **1 ppm** then repeat **step 3** a second time
6. **Refill** with fresh distilled water to the recommended level for operation

## How do I reset the 'Change Water' icon

Press and hold the 'Mode' or 'Flow' button in the top left hand corner of the screen to stop the 'Change Water' icon from flashing

## If you don’t use your machine for a while

If you use your machine on a regular basis of at least once a week, then you can simply keep the water levels topped up and nothing specific needs to be done.

If the machine is going to be sitting idle for an extended period of time, you do not want to leave it with a full tank of water, as this can allow microbial growth to occur inside the machine.

You also do not want to leave it empty of water, as this will allow the PEM (Proton Exchange Membrane) to dry out and become damaged.

The correct way to store your machine is to empty the tank and then put 1 glass of distilled water back into the machine to prevent the membrane from drying out.

When you return to using the machine, it is a good idea to drain the tank and replace it with new water before using it again.

# Water stone

## Best practices to prevent damage and blockages

- **Avoid touching the stone head**: Always handle by the tubing and not the porous surface. Oils from your fingers can block the pores.
- **Avoid using tap water**: Filtered, mineral or spring water is suggested
- **Do not** leave the stone in water when not in use
- **Rinse after each use** with distilled water to clear residues.
- **Let it air-dry** naturally in a clean environment. We suggest placing in a clean, dry, empty glass and allowing to air dry
- **Avoid** direct sunlight, kitchens or dusty places.
- **Handle carefully** and avoid pressing the stone into hard surfaces or dropping.
- **Do not** clean the stone with dishwashing detergent

## A waterstone that worked correctly in the past may become more restrictive or blocked due to:

1. **Mineral build-up** (limescale)
   Filtered, mineral and spring water all contain minerals which can leave calcium or magnesium deposits inside the pores.
2. **Biofilm or residue**
   Leaving the stone in water between uses can allow a thin film of bacteria or organic material to form
3. **Drying out with residue inside**
   If the stone dries with water trapped in it, minerals can crystallise inside the pores. Rinsing with distilled water after use can help to reduce this.
4. **Oil or contamination**
   Touching the stone head with fingers, or exposure to lotions, cleaning products, or kitchen grease, can coat the pores with oils that block flow.
5. **Physical damage or compression**
   Dropping the stone, or pressing it too hard against the bottom of a glass, can crack or compact the pores, reducing flow.

## Try the following to fix a blockage or poor gas flow

**Step 1**: Quick rinse

- Unscrew the head of the stone from the metal tube using kitchen towel
- Rinse the stone thoroughly under warm distilled water.
- Swirl and shake it under water to help flush out any loose particles.
- Allow to air dry before reattaching to metal tube

**Step 2**: Vinegar soak (for mineral build-up)

- Unscrew the head of the stone from the metal tube using kitchen towel
- Place the stone in white vinegar for 60 minutes.
- This dissolves calcium and limescale if any tap water was used.
- Helps clear biofilm, bacteria and other organic material that may be blocking the pores.
- Rinse thoroughly with distilled water afterwards to remove all vinegar.
- Allow to air dry before reattaching to metal tube

**Step 3**: Boiling in distilled water

- Unscrew the head of the stone from the metal tube using kitchen towel
- Place the stone in a small pan of distilled water.
- Boil gently for 20 minutes
- Allow to cool naturally in the water.
- This can loosen stubborn residues and flush them out.
- Also helps to clear biofilm, bacteria and other organic material that may be blocking the pores.
- Allow to air dry before reattaching to metal tube

**Extra notes**

Use kitchen towel when unscrewing and reattaching the stone to minimise touching directly with hands

White vinegar is also known as distilled vinegar or spirit vinegar - it is not white wine vinegar

## When to replace your waterstone

With proper care, a waterstone can last a long time.

However, over time there will be a gradual build up of limescale and organic residue that will create resistance and potential blockage in the stone.

If cleaning does not restore good gas flow, or if the pores are physically damaged, a replacement may be necessary.