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INTRODUCTION TO CHEMICALS

INTRODUCTION TO CHEMICALS USED IN AQUAFLAME

The Aquaflame range of equipment uses a standard electrical supply to produce hydrogen and oxygen by the electrolysis of distilled water. It is a highly, efficient high-energy heat source & the only by-product other than energy is water. The correct chemicals must be used with the machine for it to run efficiently. These are Potassium Hydroxide Crystals in the main cells and Methyl Ethyl Ketone in the Booster.
Do not use any Methanol-based solutions in the booster – see below.

POTASSIUM HYDROXIDE CRYSTALS

The gas production cell needs electrolyte crystals added in the form of Potassium Hydroxide mixed with deionised water.
The crystals need to be at least 90% purity and of analytical or reagent grade to ensure the machine produces the correct gas pressure. Anything less than 90% will generate gas but the lower the purity the lower the gas production will be – this will affect the flame size and power of the machine. 90% is the minimum to produce the indicated flame sizes and gas pressures.

The crystals need to be in flake form. Do not use any ready-mixed solutions of potassium hydroxide as they will not have the correct chemical ratio. It is possible to use the Potassium Hydroxide in pellet or powder form – please ensure that the powder or pellets are completely dissolved.
The chemical details of the Potassium Hydroxide are detailed below.

The electrolyte is **only** added at the setup stage off the machine, the cell then only needs the occasional top up of deionized water. Refer to the Getting Started Guide to ensure you mix the electrolyte and deionized water correctly at the setup stage.

POTASSIUM HYDROXIDE

CAS No:	1310-58-3
Appearance:	Flake
KOH	90% w/w minimum
K2CO3	0.5% w/w minimum
KCl:	0.015% w/w minimum
Iron (fe):	3ppm maximum
NaOH:	1% w/w maximum
Nickel (Ni):	5ppm maximum

Figure 1 - Potassium Hydroxide in flake form.

Please be aware that Potassium Hydroxide is caustic and will burn the skin. It is highly recommended to wear rubber gloves, a face mask, and eye protection when filling the cell on start-up.

Please see the MSDS health and safety documentation available on the website.

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METHYL ETHYL KETONE (MEK)
The stainless-steel booster located on the outside of the machine requires filling with 220mls of methyl ethyl ketone (MEK).

Butanone, also known as methyl ethyl ketone (MEK), is an organic compound with the formula CH3C(O)CH2CH3. This colourless liquid ketone has a sharp, sweet odor reminiscent of butterscotch and acetone. It is produced industrially on a large scale, and also occurs in trace amounts in nature. It is soluble in water and is commonly used as an industrial solvent.

MEK reduces the working temperature of the gas from over 3000°C to give the optimum working temperature of **1850°C** (3365°F).

MEK is a consumable, and the level should be checked daily as good practice. It will require the occasional top-up of MEK. Once the MEK becomes discoloured it should be changed. Empty the booster by disconnecting the torch pipe, allowing the old MEK to run out of this pipe on the booster.
UN Number UN1193

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ACETONE
The stainless-steel booster located on the outside of the machine requires filling with 220mls of Acetone

(**2-propanone** or **dimethyl ketone**) is an organic compound with the $(CH_3)_2CO$..
It is the simplest and smallest ketone (>C=O). It is a colourless, highly volatile and flammable liquid with a characteristic pungent odor. Acetone is miscible with water and serves as an important organic solvent in industry, home, and laboratory.

Acetone reduces the working temperature of the gas from over 3000°C to give the optimum working temperature of **1200°C** (2192°F).

Acetone is a consumable, and the level should be checked daily as good practice. It will require the occasional top-up of Acetone. Once the Acetone becomes discoloured it should be changed. Empty the booster by disconnecting the torch pipe, allowing the old MEK to run out of this pipe on the booster.
UN Number UN1090

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INTRODUCTION TO CHEMICALS

WHERE TO PUT THE CHEMICALS