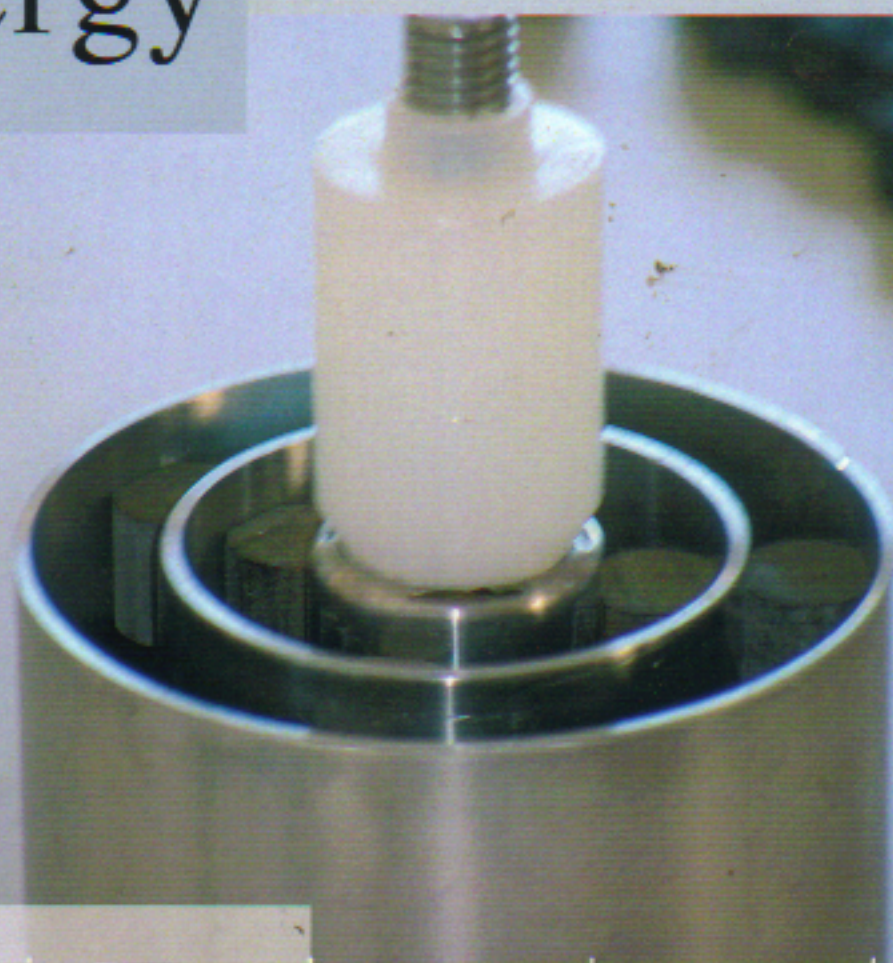


# Free Energy

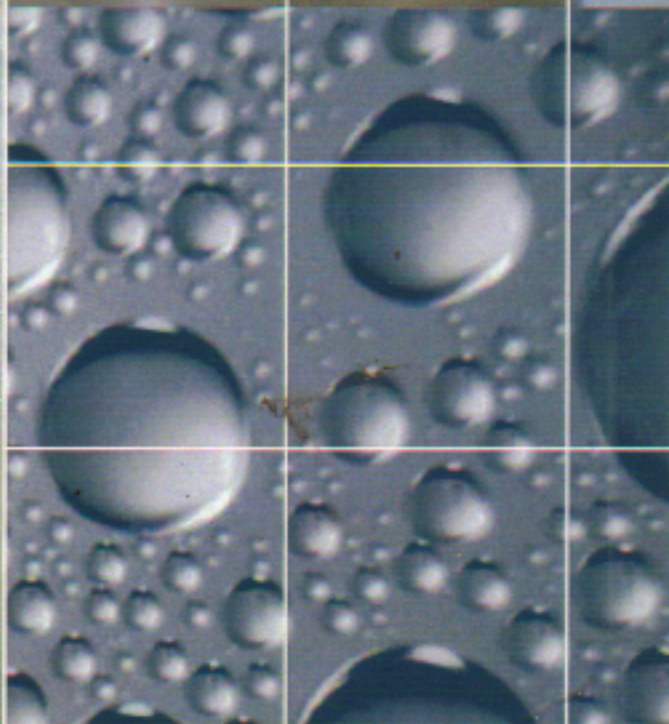
Water Fuel Cell

Secrets

Revealed



By Stephen Jones





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## Introduction

Some years ago while searching the Internet I came across a device that was claimed to be a free energy cell, known as the Joe cell. Being sceptical I read with a grin and the more I read the more I became intrigued. It was claimed that a person was trying to improve the efficiency of his car engine with some kind of water / steam cell, when he stumbled across a configuration that defied the laws of physics. Although he openly stated that he did not know how the cell worked, it did work. As he shared his findings with others, interest in this new phenomenon grew.

The more I looked for information the more I found. People had written books and made movies on these cells. Many claimed to have had success in running their vehicle on the mysterious energy coming from the cell. Some called it orgone energy and others zero point energy. An entire industry and culture had grown around it and yet so much seemed vague and unknown. Despite being a sceptic I decided to build a cell of my own. Little did I know it would become an interest that would span years and present challenges I had never imagined.

I started with a basic cell configuration that was presented on the Internet. I purchased components from a local steel supplier and a local hardware store. After going through the charging stages as explained in a book I had purchased, I fitted the cell to my vehicle and in honesty did not expect the engine to run on it, after all it would have been running on vapours from water. I was still a sceptic but this was something that so many people had spent a lot of time on and many claimed to have had results.



It was claimed that when the cell is on your engine you gradually advance the spark timing to around 70 degrees before top dead centre (TDC). Any mechanic will tell you that your car is not going to idle very well, if at all, with the timing at 70 degrees.

In the case of my vehicle I could not physically turn the distributor far enough, but I could turn it enough to know that the engine should have been pinging and running rough. The facts



are that it was not. The other claim was that the engine could idle at a much lower speed than was normally possible, and it did. I was able to get the engine to run at only a couple of hundred revolutions per minute (RPM) and as smooth as it was at normal idle speed.

Now I was moving from sceptic to amazed. I also noted an increase in power. This was never measured in any scientific manner as I did not have the ability to. I often commuted up a long and very steep hill and would always hold up traffic as I struggled to get up the hill in second gear. When the cell was on the vehicle I went up the hill at the speed limit in third gear with ease. I should point out that the petrol was also on. The information I had read suggested that you run the vehicle on petrol, and periodically adjust the timing until the vehicle could run on the cell alone. I had not got to that point. The effects of the cell were not consistent, the idle speed of the engine was constantly changing and my cell design and installation was far from what I had read to be recommended by others.



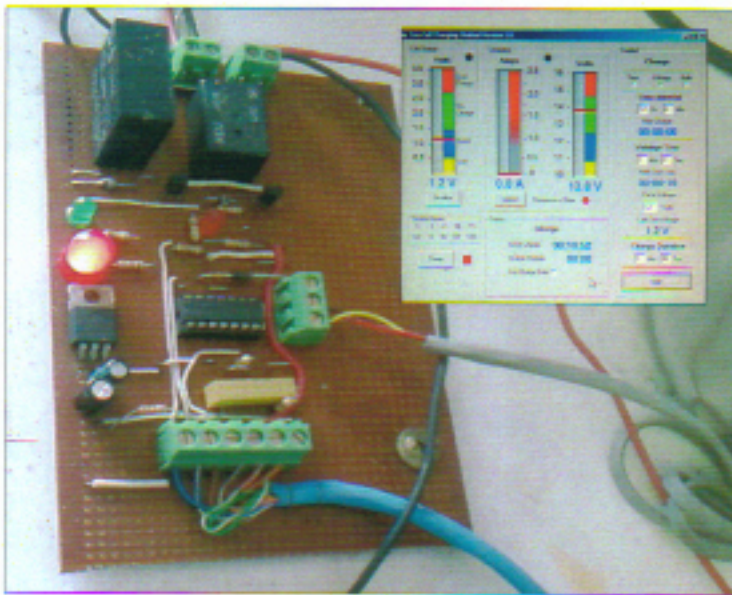
A good friend lent me a four stroke generator that I mounted on my bench next to the cell. I had read that the engine needed to be water cooled but beggars cannot be choosers and I thought that it was worth a try. Although there is little change required to the mechanics of an engine, the spark timing had to be adjustable and so the modifications began. I added electronic ignition, I removed the fuel tank and moved the output and control panel so that I had better access to the side of the engine.

The outer case of my cell was made from plastic storm water fittings, so I decided to build a better cell and set it up in a manner that would let me do testing and fully understand what was going on. In my vehicle the cell was hard to get to and I had few options when it came to installation. So I decided to remove the cell from the vehicle and conduct what I thought would be a few simple tests on my workbench. I wanted the cell hooked up to an engine so I could do some measurements and find out how it worked.





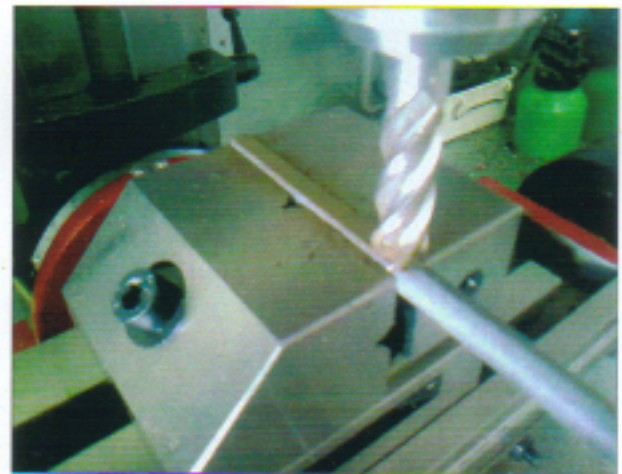
Next I built a new cell. This was not the most prosperous time in my life and funds were limited so even this cell would be a compromise on what I read to be perfect. At least it would not be housed in plastic fittings. To date my method of charging the cell was by manually applying the 12 volts to it for given periods of time at different intervals. In some instances I would get up in the middle of the night to charge it.



With many years of experience in the design and manufacture of computer control and interfacing equipment, I decided to build a device that would monitor my cell and control its charging. From that concept came a purpose built interface and dedicated control software that ran my cell. This paved the way to my understanding of what was going on inside the cell and what was needed to make it work more consistently.

Throughout the process of my development I needed to manufacture many different components. One component required milling and so I decided to purchase a milling machine. In an uncanny conversation with a guy from the machine sales company, I was asked had I ever heard of water fuel cell, I replied yes and that I had one working on my bench.

I went on to say that I was purchasing the mill to manufacture components for my cell. It turned out he was the president of a local group involved in alternative energies. He had travelled interstate to meet with the person who had discovered the phenomena and was building a cell of his own. He offered to personally deliver the mill if he could have a look at what I was doing, so I agreed. From that contact I met others who had built cells and been involved in water fuel cell projects.



It was fantastic to discuss what I had learned, to get their points of view and present my own theories on what I thought was happening within the cell and how the engine could run on its energy. I was told that I had developed a better understanding, and that my theories were more scientifically plausible. Some said that I had discovered more than people who had been working with the cell for years longer than I had. As I met more people involved in cells who kept asking me the same questions, I decided to write this book and share what I knew.

So here it is, in this book I will explain how I built a cell and how to process any water, even tap water, to the point where it is ideal for use in a cell. I will also explain how to condition your cell for charging, and how to charge it. I will run through the process of how I modified my engine's ignition timing and electrical system. I will show you my latest cell designs and configurations, and the latest methods of connecting a cell to an engine. I will present my results and an up to date insight to where my research is taking me and share with you my formulas for charging and testing the state of any cell...



# How it Works

Here I present my theories on this exciting new phenomena. Most of the information I have read presents explanations that are in the realm of new sciences, where I believe it can all be explained within the boundaries of conventional science. I believe the concepts I present are supported by the research of others working with similar concepts in more established fields.



## How it Works

First I must clarify that although it states "Free Energy" on the front cover, this only refers to the fact that you do not pay for the energy. The engine still uses energy, and you do not get out more than you put in, therefore it complies with Faraday's laws. The energy is simply derived in a unique way from the components of the air going into the engine. In the same way that it takes less energy to refine crude oil than is available from petrol, it also takes less energy to create an environment that permits the engine to run on air than is available from the air.

For most of my involvement in this project I have had continued Scepticism from most people. It would seem that we are almost conditioned to believe that alternative energies can not exist. If it is too good to be true, then it is not. Even the person that first stumbled upon this technology in modern times could not explain it and from that inability to explain came many theories by others, some so unconventional that they further fuelled the sceptics disbelief and made it almost impossible for those skilled in the art to become involved.

Here I present my theory, a theory that I believe complies with conventional laws of physics and is simply a progression of technology. Having said that if a person of scientific background does not investigate my beliefs before condemning them, they do not serve their art and or potentially man kind.

To explain just what the energy is and how it works we need to consider it from two perspectives. The first, "The Cell", what is the energy, how is it produced and how does it get from the cell to the engine. The second, "The Engine", how does it use the energy and what unique process takes place that has eluded the minds of great scientists for so many years.

### The Cell

The cell is the device that extracts the energy from the water. For this part of the explanation let us consider the first stage in the extraction to be principally electrolysis, where a voltage is applied to two metal plates immersed in water and a current flows. From conventional science we would expect this action to cause the release of hydrogen and oxygen gasses, and it is so. The plate connected to the positive voltage produces oxygen gas and the plate connected to the negative voltage produces hydrogen gas. This is the point where I believe a unique action takes place in the water fuel cell. For those who think the cell is just making hydrogen, we are using so little current and at such a low voltage that Faraday's law tells us that we could not make enough hydrogen to run the smallest engine.

The oxygen gas is released into the area above the water and serves little purpose.

The hydrogen gas however is of interest to us. When I say hydrogen I should point out that I do not only refer to hydrogen as expressed in the normal H<sub>2</sub>O formula, we are more interested in heavy hydrogen (deuterium, found in all natural waters) and also pure hydrogen.

As stated, at the positive plate, in the process of electrolysis, we generate oxygen gas and therefore at a molecular level there must be an instant where the remaining molecule against the plate consists of hydrogen. We would assume that the hydrogen molecule travels through the water to the other plate where the hydrogen gas is being produced. I do not believe this to be the case for all of the hydrogen, especially the heavy hydrogen and possibly pure hydrogen.

It became apparent to me that a small portion of these momentarily unattached hydrogen might in fact be attracted by the applied voltage, and migrate into the structure of the metal itself.

Sounds a little far fetched? We know as fact that hydrogen not only penetrates but leaks through metal containers. Companies are developing ways of stopping this from happening.



Additionally the nucleus of deuterium, called a deuteron contains a neutron, whereas the common hydrogen nucleus contains no neutrons. I believe the neutron may play a part in the electrical attraction and migration of deuteron and hydrogen into metal.

In the preparation of the cells water, we electrically charge the water, giving it a strong negative charge whereas all natural water has a positive charge. This further promotes the interaction and migration into the metal and permits the water to act as a partial barrier resisting the hydrogen's attempts to return to a natural state.

At all times the hydrogen/deuterium is trying to return to a natural state and given opportunity will flow to a negative potential. Therefore it should be considered that there is an optimum balance where we have suitable electrical potential, be it by the application of voltage across the cell or electrically charged water within the cell, to stop this natural return.

When we talk of an electrical attraction we are ultimately talking of an attraction to the electrical source. I believe the hydrogen/deuterium enters the metal and migrates through the metals crystalline structure toward the point where the electrical charge is applied. It is through this attraction that we are able to control and direct the molecules from the cell and into the engine.

By applying a suitable voltage to the engine end of our molecular conduit, we attract the hydrogen/deuterium molecules toward the engine. Then by having a gap at the engine end of the connecting conduit, that is of a sufficient distance to stop conventional electrical current flow entering into the engine, but is not great enough to stop the hydrogen/deuterium from crossing to the negative and enter the crystalline structure on the engine. After all, throughout this process there has been a balance whereby we apply an attraction that is of suitable magnitude to prevent the return to natural state and at this point our attraction is of insufficient magnitude considering the now relatively short distance and therefore relatively greater attraction of the molecules to the negative potential.

Although the aforementioned possibly satisfies the explanation of process, I also believe the cell produces a mild torsion field. This field may well play an additional part in the process. From Einstein-Cartan theory of 1920 a torsion field is believed to be a rotating energy field that is at an angle to a magnetic field. Torsion fields are said to have speeds of one billion times the speed of light and travel through anything. Although I do not know what part the torsion field plays in the overall process it maybe apparent in the many phenomena experienced when working with these cells.

### The Cell Summary

Through the initial process of electrolysis we cause a hydrogen/deuterium doping of the metal that forms the cell. We then attract them to the engine by a voltage and provide a path for them to attempt to return to a natural state by entering the crystalline structure of the metal in the engine. The hydrogen /deuterium may not be consumed in the process of running the engine, it simply provides an environment that facilitates the nitrogen/oxygen (air) fuel. To maintain the condition we periodically replace the water in the cell with freshly charged water. The interval of maintenance has not been determined but thought to be many months or even years.

### The Engine

Having entered the crystalline structure of the engine a relatively slow process of doping occurs until there is a presence of hydrogen/deuterium molecules on all surfaces of the engine especially those of the intake manifold and combustion chamber/s. I say relatively slow due to the fact that the effects of the cell can take hours to occur in an alloy engine and longer in an iron engine. Once this has happened I believe that when air is compressed to as little as two atmospheres and ignited in the encapsulation of a hydrogen/deuterium doped chamber a unique reaction occurs that allows the



nitrogen to become our primary fuel in what is initially an endothermic reaction. Endothermic reactions are implosions that draw everything in, including the heat of the reaction itself. An endothermic reaction is a well documented phenomena.

When an internal combustion engine is running on a fuel that combusts (petrol or LPG etc.), we ignite the fuel when the piston is at the top and the resultant explosion forces the piston downward. With the new phenomena we start with an implosion. If that was not the case there is no way that an engine could idle with a spark advanced to 70 degrees. I believe the implosion not only causes the piston to be drawn up but the valves to leak and more air to be drawn into the combustion chamber. I also believe this conclusion to be further supported by the fact that an engine running on a cell appears to have little or no compression when pull starting it and why it can idle at such low speeds. I have personally had my engine running smoothly at only a few revolutions per minute, the compression stroke alone should make this impossible under normal conditions.

I believe the implosion phase of the cycle only lasts a few degrees, then as the piston continues upward compressing the remainder of the air in the chamber, some of the energy of the endothermic implosion, including some of the heat is released, and at about the top of the stroke an explosion occurs. This explosion may be assisted by the presence of the hydrogen/deuterium doping of the combustion chamber. It should also be considered that the remaining atmosphere in the chamber may have an altered ratio of nitrogen and oxygen as a result of the initial endothermic reaction.

Also supporting my theory is the fact that an endothermic reaction draws in or consumes the heat. Myself and many others have found that engines running on a water fuel cell run cold. In my case simply warm, but I have read and heard of occasions where frost has formed on components of the engine and even the exhaust. This dual process of implosion and explosion may also explain the increase in power that has been widely reported. Power variations must also be related to the different energies obtained from the atmospheric fuel.

The fact that myself and so many others have found engines to go quiet and abnormally smooth when running on a water fuel cell may be due to the reduction in the inertia caused by the normal compression stroke of an engine.

It is important to note that for the successful operation of an engine with this phenomena requires all surfaces to be doped with the hydrogen/deuterium and in some instances a voltage needs to be applied to the turning crankshaft to promote an initial migration from the cylinder walls to the pistons. This is done by applying a voltage and arcing the turning crankshaft pulley or flywheel for a very short period of time.

This procedure can be very dangerous and serious injury or death can occur should you become entangled or the object used becomes a projectile if caught by a moving surface of the engine. Only ever arc on a surface turning away from you and be cautious of all moving parts, including electric or thermal fans that may start without notice.

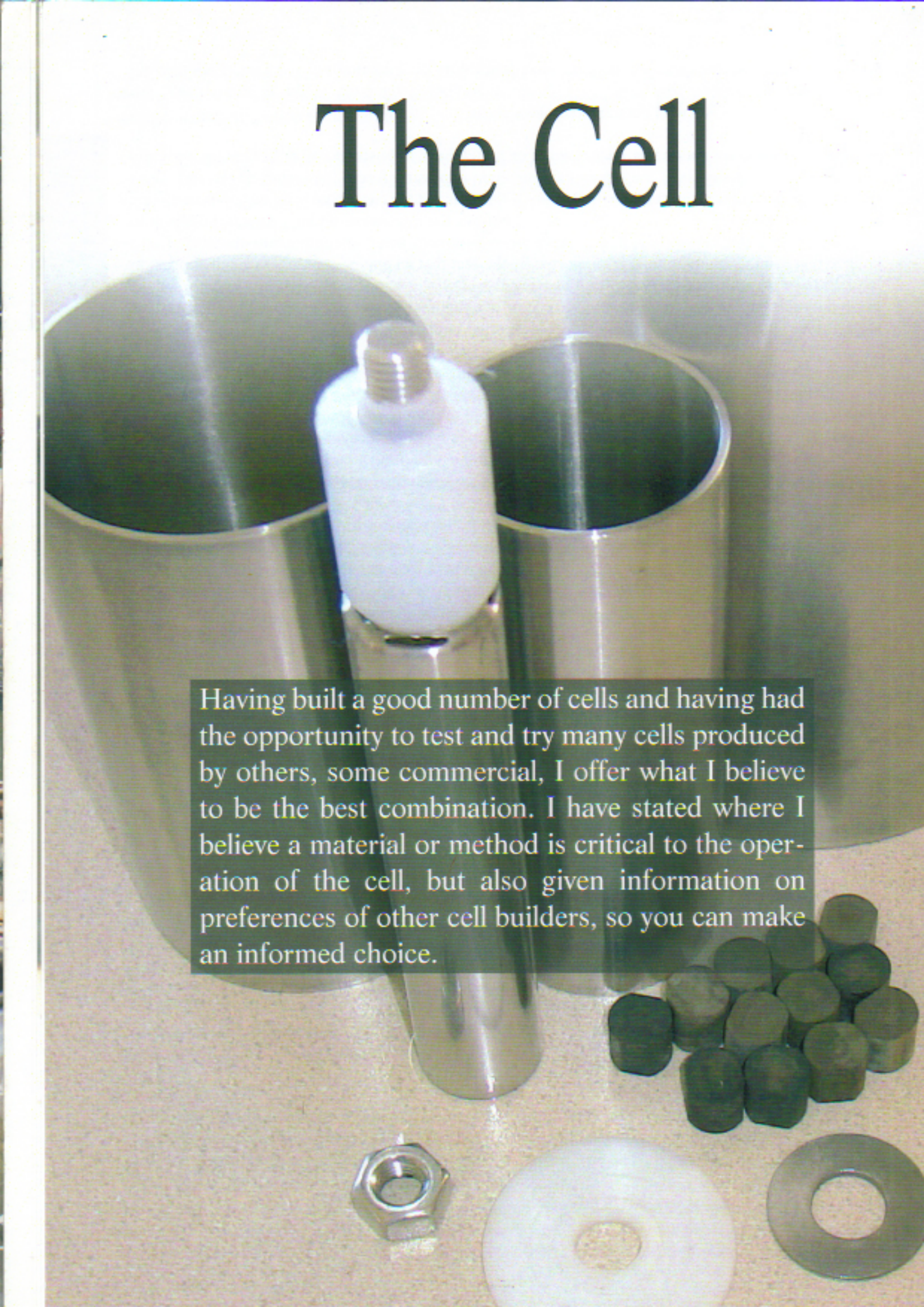
The only reason for arcing the turning crankshaft is that it reduces the possibility of damage to the engines bearings and cylinder bores by the current flow.

### Engine Summary

In summary, I present a theory that although I do not have the ability to prove, it provides some possible explanation for the phenomena that is taking place. Being a relatively simple man with no formal scientific education, I base my assumption on my understandings, observations and on information published by others whom are skilled in their art and working on the actions and reactions of the same elements but in other fields.



# The Cell



Having built a good number of cells and having had the opportunity to test and try many cells produced by others, some commercial, I offer what I believe to be the best combination. I have stated where I believe a material or method is critical to the operation of the cell, but also given information on preferences of other cell builders, so you can make an informed choice.



## How Big to Build a Cell.

Not enough is known about the relationship of cell and engine to honestly indicate what size cell is required for what size engine. I am still experimenting with methods of getting the energy into the engine and it could well be that only a small percentage of the energy produced actually gets to where we need it. I have only ever run an engine on a 4 inch cell, 4 inches being the outer diameter of the container, and I have never ran a large capacity engine. I have seen what I believe to be credible videos of small car engines running on 4 inch cells and larger V8 engines running on 5 inch cells. In the section "My Continued Development" you will find the reasons that I believe we do not need a large cell, in fact bigger may not be better. I think it is more about getting the energy from the cell to the engine.

The other component of cell size is cell height and the height of the neutrals inside the cell. For this, I use a formula where the height of the neutrals are twice the diameter of the largest neutral. If the largest neutral is 3 inch diameter then it should be 6 inches long and all of the other neutrals should also be that length. Giving consideration to magnetic and torsion fields and leakage from the cathode or neutrals to the bottom, with an exposed stainless steel bottom, I prefer as much distance below the neutrals as possible.

Although a charge is established between cylinders we must consider the overall charge and relative voltages between cylinders and the bottom of the cell. The other component that comes into play is that the charge is not over the entire gap between the cylinders. If you place a multi meter lead on the cathode and place the other lead in the water between cathode and nearest neutral you will find that the voltage remains reasonably constant for most of the gap and only reduces in the last millimetre as you approach the cathode. This suggests that the charge is in fact a surface charge established on each surface of the cell. The remainder of the water between each surface is little more than a resistance that ties each charge together.

This being the case, let's consider the voltage relationship between cathode, neutrals and the bottom of the cell. Remember we are only considering the charge remaining in the cell, not what happens during charging. With our 2 neutral cell we have 1.2 volts from cathode to case (outer) and the distance working outward is the sum of all gaps, lets say 0.5 inch each, a total of 1.5 inches overall. So with respect to the cathode and case we never want the gap to be less then 1.5 inches and therefore the cathode should be a minimum of 1.5 inches from the bottom of the cell (which is also the outer case). Now the first neutral, the gap from it to the highest voltage (the outer case) is 1 inch and therefore should never be closer than 1 inch from the bottom. The second and final neutral is 0.5 of an inch from the outer case and should therefore never be closer then 0.5 inch from the bottom. If you consider all of these points, you end up with a theoretically balanced cell if the bottom is angled at 45 degrees, a simple cone shape and the cathode is spaced 1.5 inches up.

Thankfully, I do not believe you need to go to all of the trouble. I have conducted many tests and providing you have the cathode at the correct height, you can even have a flat bottom and it makes no difference. The formula for the correct cathode height is simply:

$$\text{Cathode Standoff Height} = (\text{Case Diameter Internal} - \text{Cathode Diameter}) / 2$$

$$\text{Example: Cathode Standoff Height} = (4 - 1) / 2 = 1.5 \text{ inches}$$

Case Diameter	Cathode Diameter	Cathode Height
4 inch	1 inch	1.5 inch
5 inch	1 inch	2 inch
5 inch	2 inch	1.5 inch



Although the water does not go to the top of the cell, I like the top and bottom to be equally spaced from the neutrals. This makes the cell balanced with respect to magnetic and possibly torsion field influences.

The formula for the overall height of the cell then becomes:

$$\text{Cell Height} = (\text{Largest Neutral Diameter} + \text{Cathode Spacer Height}) \times 2$$

$$\text{Example: Cell Height} = (3 + 1.5) \times 2 = 9 \text{ inches}$$

## Cell Construction

Having established your cell size with the above information, we can now start to build it. All of the material in the cell must be 316L grade stainless steel. The letter "L" after the grade number, i.e., 316L, means that the carbon content is restricted to a maximum of 0.03%, normal 316 has levels as high as 0.08% and in some grades can be as high as 0.15%. This lower level of carbon is usually used where welding will be performed. The lower level of carbon helps to prevent the chromium from being depleted at the weld site and therefore allow it to remain over 10.5% so it can form the "passive" oxide layer that gives stainless its corrosion resistance. In our application it simply makes the metal more suitable for use in the cell.

### Selecting and Preparing Tube

Do not friction cut any component in the cell. Friction cutting leads to magnetism and distorts the metal. If you can only purchase friction cut steel, get it an inch longer than you need and saw half an inch off each end. The finish of the ends is also very important. I have tried every method and studied the results. If the end is in any way rough, bubbles will form on it and etching will occur. I have precision ground tube ends to the point where the ends are dead flat and at right angles to the sides. The problem with this is it promotes electrons to come off the corner and again promoted etching. I have found the best finish to be a ground top with a slight edge radius of approximately 0.2 of a millimetre. This would seem to minimize etching and offer a good surface for levelling the height of each component.

The other thing to watch for when purchasing tubing is the welded seam. If you use a quality welded tube the seam will not be visible on the outside and only just visible on the inside. The width of the weld should only be a few millimetres and it should be flat or almost flat. You do not want a tube with a pronounced weld as it is too hard to polish and will affect the cell's operation. I get tube that has such a fine seam that I have trouble finding it when polished. The other option if you can get it is seamless tube but it is very expensive. A cell made with seamless tube can cost \$2000 dollars, so few go that way.

The finish of the tube is critical, especially the inner surfaces. I use 800 grit wet and dry paper and find this gives me a good finish on both the inside and outside surfaces of the tube. The reason we need a good finish is to get finer and more even electrolysis. If the finish is rough bubbles form on every peak or speck of dirt and you will end up with large bubbles, and more unnecessary gases. Remember we are not trying to make hydrogen gas, we are splitting the water molecule to encourage the migration of hydrogen/ deuterium into the metal. If you use a buffing or polishing compound, make sure it is completely water soluble and thoroughly wash off any compound when you have finished.

The bad news is it can take many hours to get a good finish on the stainless steel, especially the inside surfaces. If you can afford it, having the tube professionally polished is a easier way.



## Cathode

The first step is to build the cathode assembly (centre and smallest tube). The length of the cathode will be equal to that of the neutrals as per the aforementioned formula.

### Cathode Fixing

You basically have three options for cathode fixing: Firstly to have a large bolt welded into the end of the cathode, secondly a nut welded in the cathode and the third option is a piece of solid stainless steel rod drilled and threaded through the centre, then machined to be a tight friction fit when pressed into the cathode.

I prefer the options of having the cathode insert as shown in the photo, thus eliminating the need for any negative effects of welding. It should be pressed with the cathode as hot as possible, making it even tighter when the cathode cools down. Do not make it so tight that you distort the cathode when fitting it.

With the welded nut or insert options the cathode simply screws down onto a cathode mount/spacer assembly, permitting the assembly to remain in the cell and the cathode and neutrals to be changed without disturbing it or the water seal in the bottom of the cell.

You must also have provision for water to circulate through the cathode. I mill 3 flats along the side of the cathode insert before press fitting it inside the cathode. The length of the cathode insert does not effect cell operation but it must be true, otherwise your cathode assembly will screw on at an angle and that must not be the case. There are many points of view as to how the bottom of the cathode should be finished. Some say the nut or insert should be set up inside the cathode by a few millimetres and claim it is to do with electron flow. Others say that it should be flush with the bottom. I have tried both and cannot detect any difference as far as cell operation is concerned. I prefer to have the nut or insert flush with the bottom as it is easier to get a good finish.

If welding, I find it better to start with the cathode tube slightly longer than needed, this permits me to turn the assembly in the lathe and take off any uneven surfaces caused by welding. If you chose an option that requires welding, only ever MIG or TIG weld any components of the cell and make sure the welding wire is also 316L. The reason for this is that other forms of welding can introduce magnetism and we also need consistency in the metal itself.

### Cathode Stud Assembly

The cathode stud assembly will be determined by how you chose to mount the cathode. Firstly I will cover the type suitable for a thread fitted into the bottom of the cathode. This is basically a short length of 316L stainless steel threaded rod and a cathode stand off spacer and bottom sealing spacer, plus a couple of nuts and a washer.



Press fit the insert into the cathode tube



The insert is flush with the tube



The length of threaded rod is determined by the cathode height from the cell bottom, the length of thread you want to go into the cathode and the thread protruding from the bottom of the cell. The piece I use is generally about 85 millimetres. The diameter of the threaded rod is of course determined by the thread you put in the cathode, or vice versa. I use a 10 X 1.5 mm thread.

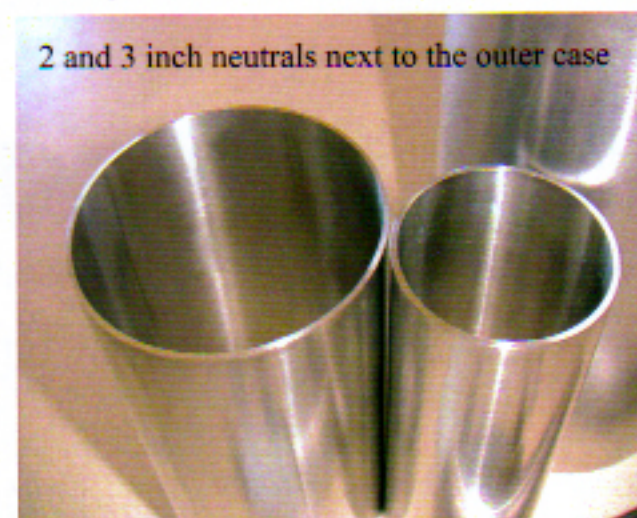
The cathode stand off spacer can be made from nylon, PTFE or ebonite. I have used all three and in my opinion ebonite is the only way to go. Although all of the aforementioned provide strength and electrical insulation, ebonite is the only material that would seem to be statically inert. It is almost as if it is not there. Nowhere near as many bubbles form on it and little to no etching occurs at the point where it comes into contact with the cell bottom. This can be a problem with other materials.

The cell standoff should be approximately 1 inch or 25 mm in diameter and have a slight angle on the top to permit water to enter the bottom of the cathode tube. It should have a hole drilled in the centre and be threaded with the same thread as your cathode stud (10 mm). The other end should have a step machined in it that is a snug fit into the hole in the bottom of the cell. It should just be flat with the bottom of the cell but must not be protruding. If the cell bottom is 6 mm thick then make the step in the standoff 6 mm. Next you need an insulating washer for the outside of the cell. This can be made of any firm, non conductive material. It should have a hole in the centre that is a snug fit on the stud and should be approximately 30 mm in diameter. The material I use is nylon and is approximately 6 mm thick.



## Neutrals

The neutrals are simply tubes cut to the length indicated by the aforementioned formula. Neutrals should be 316L stainless steel, and all tubes used in the cell should have the same wall thickness. I use 1.6 millimetre thick tube, it is the common size, strong enough to not distort when we assemble the cell and reasonably light. Most spacers that hold the cell together do so only by a friction fit, so you do not want unnecessary weight. Try to get tubes that are as round as possible. If you turn the tube in your hand, it should feel perfectly round, no flat spots or bumps. Again watch for the quality of the welded seam, do not friction cut and have the ends ground with a slight edge radius.



## Outer Case

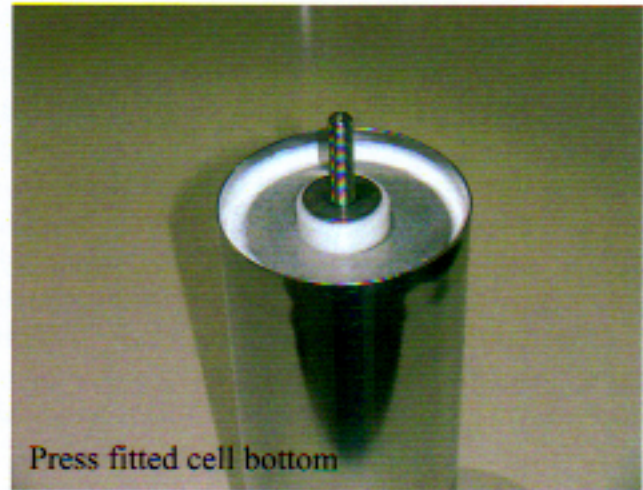
From the information provided earlier you know of the option in design for the outer case - flat, rounded or angled. I have used both flat and rounded bottom cases and personally I prefer the flat



bottom cell. With the flat bottom you get less unwanted interaction between the case and neutrals. The flat bottomed case is not generally distorted in the process of welding or fitting the bottom, it costs less to produce and it is easier to stand and work with on the bench. I should in all fairness point out that providing you have sufficient clearance between the neutrals and the base, rounded bottom cells would seem to work just as well as flat bottomed.

My first cell that was fitted to and ran the generator had a flat bottom that was an oversize disk, with the tube placed centrally on it and welded all around. It was oversized as it provided for securing the top by long threaded rods. I no longer use this method of construction, too hard to assemble and unnecessary.

My current method of construction is by far the simplest and I believe the best way to go. I cut and machine the ends of the outer cylinder (4 or 5 inch tube) making it about a half an inch longer than calculated and press fit a flat bottom into it. I use a 6 millimetre flat disk for the bottom and set it about 6 millimetres up. This gives me a lip to run a bead of sealant around to ensure no leaks. If your bottom disk is well finished and you have no protruding seam inside the tube it should not leak anyway. As with the press fit cathode insert, it is far better if you heat the tube when press fitting the bottom as it will be much stronger. If your application may subject the cell to vibrations or sudden shock type movement it will pay to have three tack welds placed at 120 degrees on the bottom of the disk. If this is the case be careful that the weld does not go through to the inside of the cell as it is almost impossible to clean off and refinish and it will affect the cells operation.



Before fitting the bottom, you will need to drill a central hole for the cathode mounting assembly. I normally drill a 20 millimetre hole. This permits for a reasonable insulation between the cathode bolt and cell bottom.

## Cell Top

You have 2 options in cell tops and from those there are many ways of connecting the tops to the cell. The type of top you use will be determined by the way you choose to connect the cell to the engine.

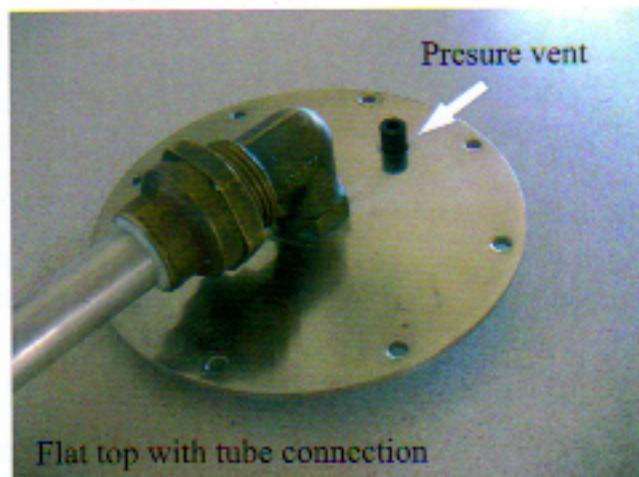
The first type is a cone top that has a tube going to the engine. The advantage of a cone top is the ease of fitting it to the cell, it just slides over the outer cylinder (case). The disadvantage is it is by far the most expensive to produce and can be difficult to get a good seal around the cell. I have also had some experience where I could not get a cone off. Most cone tops are constructed from sheet and tubular steel and if my theories are correct lack the mass to carry the energy.

In fairness to the cone top I should point out that many well respected people who have worked on cells for years claim that the cone top is the only way to properly get the energy from the cell. They also state the cone must be manufactured to a precise angle to work properly. As can be seen in the photos I have used cones manufactured to the correct angles but have had no more success with them than I have had with flat tops.



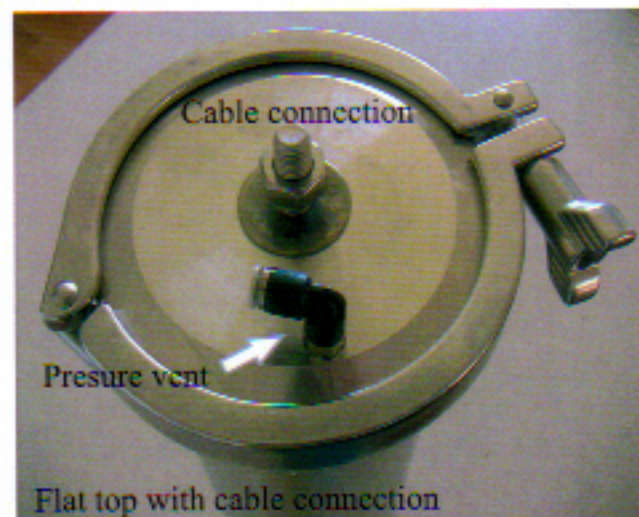


The second type, and possibly the most original, is a flat stainless steel top with a right angle fitting, that has a tube going to the engine. I have seen this on videos and it has been reported to work well. It is also the method I first used on my generator and it worked. You can see in the photo that I used a brass fitting to connect the tube, however it did have an aluminium slave inside it. This top was connected to the cell by long threaded rods that went from top to bottom of the cell. I have seen examples of a similar top screwed to a rim welded around the top of the cell.



Flat top with tube connection

I have made a variation to a flat stainless steel top. The difference is that this has a cable connection from the centre of the top that runs to the engine. If the energy can pass through the solid blind plug and then into the solid metal of the engine why does it need a hollow tube? I believe in this case the hydrogen/deuterium travels through the crystalline structure of the metal and I simply say why not have many conductors in the form of a heavy cable.



Flat top with cable connection

The cable must be made of aluminium with pressed or machined aluminium end connectors. Heavy duty 12 millimetre cable used for high power mains is quite suitable for the application. The biggest advantage of using cable is the ease with which you can connect and route it to the engine. I should point out that it is something I am only now working on and so far I think it is the way to go, but certainly not proven. If you would prefer to start with a proven method then go for one of the other tube connection types mentioned.



Press fitted flange for flat top connection

To fit the solid top I use a press fit flange that is pressed on to the tubing and I then apply a bead of sealant to ensure a good seal. Please note that both flat tops have vent holes to prevent any pressure from building up within the cell.

### The cell must never be completely sealed or it will explode.

Never use hose clamps on the connecting tube on a cone top cell. This permits gases to escape and acts as a pressure safety feature. All cells must have some vent capabilities and must never be completely sealed.

If you use a cable connected top you must make provision for a cell pressure vent. The vent should be a zero pressure type (always open) and the possible gases should be kept away from any source that may ignite them. Should a cell explode serious injury or even death could occur. Although we do not use hydrogen, the cell will produce it.



## Spacers

I have tried different spacer materials and most break down rather quickly. When I say break down I am not talking in the electrical sense as many suggested to be the case. What I believe happens is the hydrogen /deuterium is constantly trying to get back to the cathode, it can not get through the charged water so it attempts to go through the spacer. I have personally had surgical rubber change colour and turn into a thick goo in a matter of days. This is in water that is relatively pH neutral and should not effect the rubber.



Machined ebonite spacer

The only materials that I have had good success with are PTFE and ebonite, and I believe that ebonite is by far the best. Both work well within the cell and do not break down but PTFE is not as statically inert as ebonite and causes more etching on the cylinder walls. It is reasonably important that all components of the cell are perfectly concentric so your spacers need to be made to fairly close tolerances, within 0.01 of a millimetre. If machining either PTFE or ebonite please work in accordance with the material manufacturers safety and handling procedures, as PTFE fumes can be lethal.

The thickness of the spacer depends on the spacing of the components (cathode, neutrals and case) and thickness of the material. With standard 1, 2, 3 inch tubing that is all 1.6 mm thick I find my spacers need to be 11.25 millimetres thick. I make all spacers 12 millimetres long, this gives sufficient area to hold the components in place and minimizes the displacement of the water. If you do not have the ability to machine the spacers you can purchase them from [www.NUTECH2000.com](http://www.NUTECH2000.com). They may be slightly oversize, one size fits all, but you can easily sand one side to make them a tight fit.

You will need 6 spacers per neutral, 3 at the top and 3 at the bottom. You do not need nor should you use spacers between the last (largest) neutral and the outer case. The energy is so great at this point that any spacers will break down and etching will occur. Simply make sure your cathode mount assembly is rigid enough to give good support to the cathode and neutrals.

## Establishing Magnetic Properties

The next step is to try and establish if your stainless steel has any magnetic properties. It should not have, but in most cases it does, so we need to get all of the magnetic fields of the various components in line. A simple technique is to hang a small neodymium magnet on a piece of cotton about 30 cm long. Mark the magnetic poles on the magnet, just a "N" and "S" on each side will do, then hang it from something. I prefer to hang the magnet and move the steel around it, that way you do not get the pendulum effect of moving the magnet. If your stainless steel is not magnetic the magnet will not move. Pay special attention to the seams, because if there is a problem with the steel that is where you usually find it. If the magnet turns or is attracted to the steel, take note as to the polarity, as like forces repel and opposites attract, so if the North is attracted, your steel is South at that point and vice versa. In almost every case if there is any magnetism it will run along the length of the tube, North one end and South the other. We need to have all of the North ends lined up and to be at the top of the cell, so using a marker pen place a dot on the northern end of each tube. I recommend you put the dot in line with the seam as it makes it easier to assemble the cell.

## Flashing The Cell

It is reported that you should do what is known as flashing the components of the cell. This is a process of passing current through each component (cathode, neutrals and case) to generate a magnetic field and align any magnetism within the component. The process is to connect a wire from the negative terminal of a battery to the bottom inside surface of the component at the point where



the welded seam is and then with a second wire connected to the positive terminal of the battery that you flash on the top outside edge of the component, again at the point of the seam. The term flashing refers to just quickly dabbing or running the edge of the wire at that point. This causes a huge amount of current to flow. And in accordance with Lens's Law a magnetic flux or field is generated. It sounds a good idea, but can be very dangerous. If you have a fuse in one of the wires it will blow it. If the wire welds itself to the component, it will very quickly melt, possibly catch fire and you run the risk of the battery exploding if a spark ignites the vapours coming from it. Flashing is a procedure that many think is necessary when assembling a cell and that is why I explain it here. Personally, it is not only very dangerous but it leaves burn marks on you're components and having tried it, I do not do it!

## Magnetic Alignment

Now with incredibly powerful neodymium magnets we can align stray magnetism in the cell in a far more gentle way. When the cell is completely assembled I place a 1 inch neo magnet on top of the cathode and leave it there for a few hours. This would seem to align any stray magnetism within the cell in the same way that flashing does, but without the hassles. Make sure you have the South side of the magnet against the cathode and North pointing upward. When you have done it, put the magnet in its keeper and store it far away from the cell. Your cell will never charge with a neo anywhere near it.

There is one point that I will make, as it may be very relevant to your location. I live in the Southern Hemisphere and all of my procedures are reliant to it with respect to the magnetic poles of the earth. Please research and establish the magnetic polarity you should be trying to obtain in your location.

## Putting the Cell Together

The first part of assembly is to check the finish of all components as mentioned earlier.

It is important that every component of the cell be perfectly clean. Fingerprints stop electrolysis and promote etching as does even the smallest particles of dust and dirt. I wear cotton gloves when assembling a cell. I first wash each component with white vinegar and dry it thoroughly with a cotton cloth before assembly.

The first step is to clean the outer cylinder (case) and mount your cathode stud assembly in the bottom. Do not place any sealant inside the cell. Put sealant on the washer that goes on the bottom of the cathode assembly. In the photo you can see that I have used a nylon spacer for outside of the cell. The cathode standoff spacer inside the cell is made from ebonite. You will also note the gaps indicated on the photo. It is important to maintain as much gap as possible. The cell bottom is connected to the outer case and wherever possible the hydrogen/deuterium will cross the gap and will become evident by etching on the inside of the cell. If the hydrogen/deuterium can cross back to the cathode at this point it will not go to the engine and the cell will be leaky. Be mindful of this when connecting the lead to the cathode, it should go no closer to the case than absolutely necessary.



Next assemble the first neutral and cathode. It is of paramount importance that you have all the magnetically polarized components the same way and that you align the seams of each component. **If you do not, the cell will not work.** It can be a little tricky fitting the spacers, if they are not tight

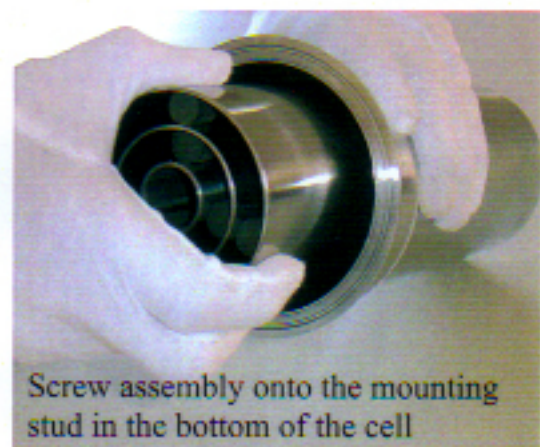
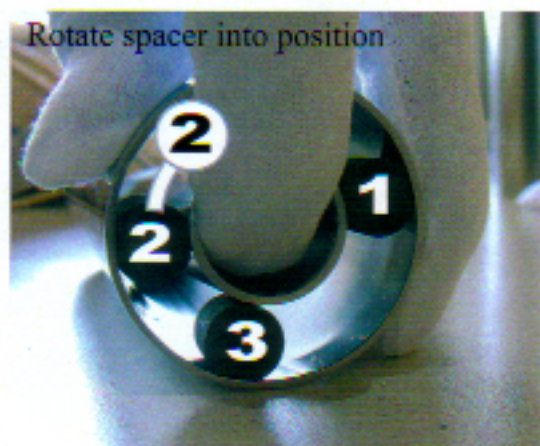
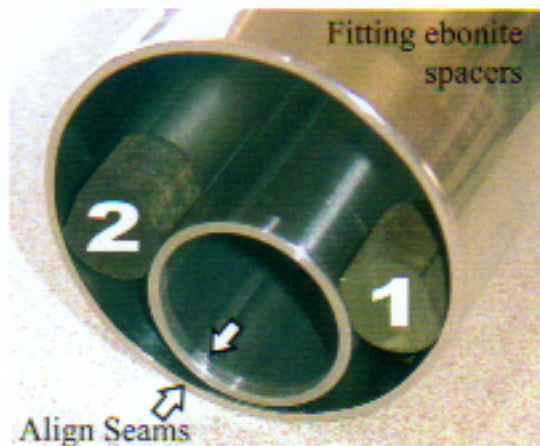


they are no good. My method is to lay the components down with the cathode inside the neutral and place a spacer either side of the cathode. Next lift the cathode until it is central in the neutral and has one spacer on either side. Note if welded tube is used the seams must be aligned as you assemble it.

Now fit a third spacer at 120 degrees to the first and then slide the second spacer around to 120 degrees from the third. When fitting and moving the spacers, only use a suitable tool that will not mark the stainless steel. I prefer to use a suitable piece of hardwood. Then turn the assembly around and do the same on the other end.

The spacers should be set in from the ends of the tube and the tops must be perfectly parallel to the top of the tubes, otherwise the rising gas bubbles cause the water to rotate and this interferes with charging. I know of no specific distance that the spacer should be set in from the top but personally I have made a tool from soft aluminium that sets them in by 6 millimetres and that would seem to be fine. Repeat the assembly procedure until you have assembled the cathode and all neutrals, then screw the assembly down onto the stud mounted in the cell. Do not fit spacers between the last neutral and case. Remember that all of the seams in the assembly must be aligned and must also align with the seam in the case. Your cell should now be fully assembled. Unless you intend to add your charged water now cover the cell or fit the top in order to prevent any dust or dirt entering the cell.

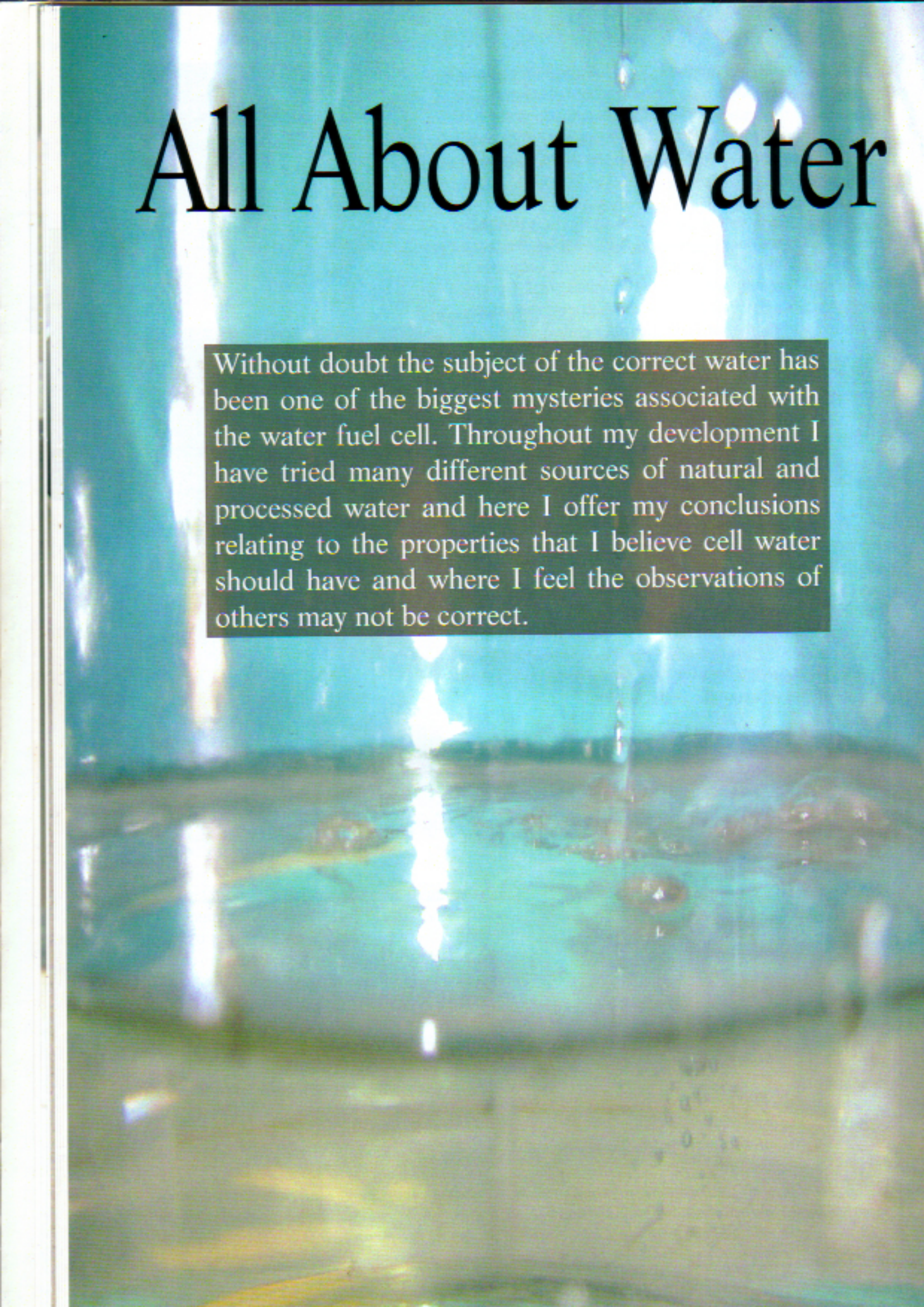
Just a note: Once you add the charged water to the cell and start to condition it, the spacers will almost bond themselves to the stainless steel. I have on many occasions had to use a rubber mallet and significant force to dismantle the cathode neutral assembly after only a few days of cell operation.



Notes



# All About Water

The background of the page is a photograph of water. It shows a close-up view of water with numerous small ripples and reflections of light. The lighting is bright, creating a shimmering effect across the surface. The colors are primarily light blues, greens, and whites, with some darker areas where the water is deeper or the reflections are more intense.

Without doubt the subject of the correct water has been one of the biggest mysteries associated with the water fuel cell. Throughout my development I have tried many different sources of natural and processed water and here I offer my conclusions relating to the properties that I believe cell water should have and where I feel the observations of others may not be correct.



# All About Water

It has been said for many years that success with a water fuel cell is all about getting the right water. It would seem that what people have been trying to do, was to find water that by enormous luck, nature had given the right properties. The description of the right water was fresh "Juvenile water", that was running over rocks in streams, even waterfalls high in the hills. It needed to possess the correct properties of conductivity, be free of all pollutants and even be what was described as "alive". The chances of finding this are incredibly unlikely, no wonder so few have had success. I must have been so lucky with the water I found in a local creek in the foot hills of Adelaide, South Australia. Even though I had some success with this water, I like many, still had continuing problems with dirt coming out of the water if I was not careful with the way I charged it.

I needed to have a better understanding of the water requirements than I had obtained from the information I had read. What was so unique about this mystical water that everyone seemed to be trying to find? Over many months I studied what happened to the water in my cell. I experimented with and charged (later described) many different waters and came to my own conclusions of what was happening and what needed to happen for the cell to operate.



It became apparent that the water needed to have as little contaminants as possible. When I say contaminants, I do not just mean man made chemicals. Water has the ability to absorb a huge quantity of matter; dirt, minerals and organic particles are just the start. The more oxygenated the water, the more contaminants it will absorb.

In simple tests you can see for yourself the staggering amount that even basic electrolysis can reveal. The picture on the left shows the amount I get out of simple tap water, and we drink that stuff! It was now becoming apparent that the need for fresh or Juvenile water was in

fact justified, the less in the water, the less I would have to remove. I tried a number of spring and bottled waters. It did not matter how clear they were when I put them into the cell, the cell continued to produce what I describe as brown gunk.

The next question was why not simply use distilled or pure water. Unfortunately the first stages of charging a cell involves straight electrolysis, passing current through the water, and pure water does not conduct electricity. So I got distilled water and added an electrolyte. Electrolyte is simply an additive that would permit the current to pass through the water, by changing the conductivity and pH or balance of the water.

The pH scale represents how acidic or alkaline the water is. It ranges from 1 acid to 14 alkaline and 7 is considered neutral. Pure water has the pH of 7, if we make it more acidic the pH will go down and if we make it more alkaline the pH will go up. My first electrolyte was simply baking soda, straight out of the kitchen. I went on to try many different substances, that made the water either acidic or alkaline, some very specialized and some expensive, but at the end of the day they all seemed to do the same thing and I would have to keep filtering the water to get my cell to go past ordinary electrolysis.

There was something else about the natural water from the creek that was missing from all the other waters I was trying. At this stage I went back to charging and filtering creek water. I developed my own way of getting the dirt out of the water and my experiments with cell and generator continued.



Each person that I met who had cell experience, would comment about the bubbles on top of the water in my cell. I must be honest although I had read, seen photos and even watched movies showing the charging of cells where the focus was the bubbles on the surface, I had not given them a great deal of consideration. I had considered the bubbles to be only an interesting side effect of charging. My interest had been to charge the cell without getting dirt from the water.



With an electronics background I thought that the cell could be working like some kind of energy battery. All of my charging was determined by the current flowing through the cell, the resultant gunk it produced from the water and the time it took for the cell's voltage to drop after charging. It was not until I had met a number of people who repeatedly mentioned bubbles that the penny dropped. The difference between creek water and all the other waters was in fact the bubbles. I had noticed that prior to the gunk forming in the water I had far more bubbles from creek water than any of the other waters I had tried. Why was that, what could it be in creek water that produced the bubbles and why did the cell seem to need them to produce the energy?



Eventually I got what I believe to be the answer. It was all about surface tension. All water has a surface tension. That is why some small insects can walk on water and why water beads on surfaces instead of just dispersing until it is all gone.

At this point I should explain a little about surface tension and it's relationship to a cell. It is not what most people think and everyone that I have spoken to who has worked on these cells, have I believe, got it wrong. Most people think that you need to increase the surface tension of the water for the cell to operate, they talk of the oily film that creates on the surface and that this is necessary to allow the cell to create the bubbles and charge. I do not believe this to be correct. When we charge water through electrolysis it increases its surface tension slightly, this is a fact. What people observe when the film builds up on the top of the cell, is simply a top surface film that is mainly the result of carbon chains released by organic material in the water through electrolysis. Surface tension does not relate to top surface only, it relates to every interface surface. That means at every point that the water comes in contact with something else.

Our prime interest in surface tension is not the top surface of the water. We are interested in the sides of the cylinders. This is where the hydrogen and oxygen gases are produced. The higher the surface tension, the larger the bubbles, and we do not want large bubbles. Why? As the bubbles rise to the top they agitate the water and we are trying to create electronically charged and polarized water. We do not want to disturb the water any more than we have to. What we need is a low surface tension. This will permit the bubbles to be much smaller and finer and rise slowly to the top with minimum disturbance to the bulk body of the water. That initial oily film that I mentioned earlier is actually removed when people wipe the dirt off the cell or filter the water. It does have a relationship to the actual surface tension of the water, but only in the opposite way that many think. By the process of removing the carbon chains from the water, we do in fact reduce the true surface tension and the cell can start the process of establishing the electrical charge and polarization of the water.



I know I'm going on a bit about this but it is important that you have a proper understanding of surface tension and the effect on the gases produced. If you have any doubts please conduct this simple experiment. Fill a perfectly clean glass with tap water, then agitate it until you have some bubbles on the inside of the glass. Note how big the bubbles are. Now tap the side of the glass with a spoon and watch how quickly the bubbles rise to the surface. Next, put a few drops of dish washing liquid into the water and watch what happens, the dish washing liquid lowers the surface tension. It does not go

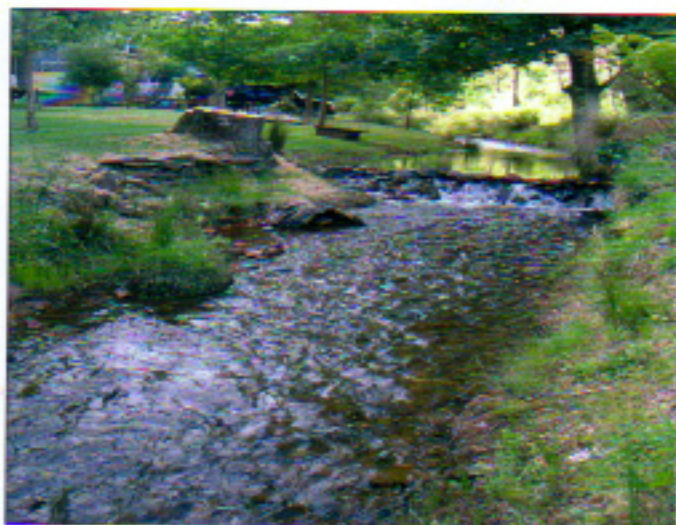


to the top, it either sinks or suspends part way down. Now give it a good mix and watch how it dissolves into the whole body of water to the point that it is invisible, with at most a slight discolouration of the water. Now note any bubbles on the sides of the glass and how small they are compared to the first test with high surface tension. Finally tap the side of the glass again and watch how the fine bubbles rise to the surface, much slower than before. This test proves that surface tension is not only relevant to the top of the water but to every surface that the water comes into contact with.

So back to the cell water. Why did creek water have more favourable properties? I started to think about how the water gets into the creek. Very little water actually falls in the creek, it falls on surrounding fields, plants and foliage and then runs into the creek, and that path is where the secret lies. In order for you to fully understand the processes, I will explain the life of water, and why we need to obtain or process water to a specific part of the cycle. We are considering what happens from when that rain first forms in the sky to when it hits the ground and then flows down the stream, into the rivers and out to sea. As we all know, water starts off in the clouds. Due to certain atmospheric conditions water particles clump together to the point where they fall to the ground. We could get a lot more scientific about the process of rain, but there is no need to for this explanation.

A couple of other very important things happen during the process of rain. The first is to do with static electricity. Rain does have an electrical charge as proposed by Wilson in 1929, but in the experimental works of Gott in 1933 it was established that there was almost as many positively charged drops of rain as negatively charged drops and the average result in a pool of water might be a slightly negative charge, but not a whole lot. Having said that, at the point of the rain hitting the ground, individual drops do have an electrical charge and even as they mix there is electrical activity happening. I believe the electrical charge in water promotes the absorption of material at a microscopic or even atomic level, that of course we cannot see. I came to this conclusion from the way I am able to remove the material with different forms of electrolysis. This is explained later in the section on how to process water.

The other component of rain that interested me was the acidity of rain. I am not talking about acid rain, normal rain is never quite neutral. I have read that most rainwater has a pH of 5.6 to 5.8, simply due to the presence of carbonic acid ( $H_2CO_3$ ), formed from dissolved  $CO_2$  gas and  $H_2O$ . The source of the  $CO_2$  is the atmosphere, which presently contains about 380 ppm  $CO_2$ . This is why rainwater is not pure and therefore conducts electricity, a key requirement for use in a water fuel cell. I should state at this point, despite what I have read, I found that most of the





rain water that I collected seems to be slightly alkaline, but I have established no reason for this. Never the less it is not pure and does conduct some electricity.

Now with a better understanding of the water and the reason for its invisible contaminants and conductivity, I only had to find out where the lower surface tension (bubbles) comes from. Nothing that I had read led me to believe there was anything present in the rain prior to it hitting the ground, so it had to be from the ground onward. The percentage of rain that actually falls on rivers and streams is so small it is not worth consideration. The majority of water falls on the land, or should we say plants, grass and foliage, before running into the streams and this was where I needed to look for answers.



It turns out that plants produce chemicals typically found on the leaves and these chemicals are the plant's immune system. They are there to stop mould and fungus growing on the plants. These chemicals are divided into two groups that come under the heading of natural surfactants.

The term surfactant is a derivative of "Surface active agent". **Surfactants** are usually organic compounds that contain both hydrophobic and hydrophilic groups, and are thus semi-soluble in both organic and aqueous solvents. An artificial surfactant known to most of us is detergent and we all know that apart from cleaning the

dishes, and our prior experiment, most detergents make bubbles. Before you get all excited and add your dish washing liquid to your cell, it's not that easy.

Most of our detergents are made from synthetic or oil based products and that's not good for a cell because they affect the electrical properties of the water differently to natural surfactants. Some dish washing liquid manufacturers also use sodium (salt) as a thickening agent and if you add that to a cell you will produce chlorine gas. Very deadly. If you need to introduce surfactants to lower the surface tension, to produce a suitable water for charging in the cell, you need to introduce natural surfactants, or at very least, surfactants that contain no petrochemical products and you need the correct type and quantity.

Now I had a reason for the increased success with natural water, and why bubbles would either not be there or be greatly reduced in processed water. If the surfactants come from the plants and is in the water when it runs down the stream, why does it matter what part of the stream we get it from? Why is it so important to get the water at the start of this process, the top of the stream? It would seem that as the water goes further down hill, it literally goes down hill in quality as well. Streams are full of dead leaves and leaves are alkaline in nature and as the water runs over it, it loses its acidity and can even become alkaline. Also, in the way that heavy grease will wipe out your dish washing liquid, as contaminants enter the water it can also diminish the surfactants.

The further the water travels, the more it gets contaminated. Contaminants can be particles of organic matter, small quantities of solids and of course man made pollutants. It may be difficult for some to understand but water can actually contain matter in a way that is invisible to the eye. Earlier I mentioned that in many cases water flows over rocks and waterfalls becoming more oxygenated.

As is now promoted in laundry detergent, oxygen helps the water to absorb particles (dirt) and in the case of laundry detergents makes the clothes cleaner. Later you will see material coming out of water



that is truly amazing. Some have even suggested that it is some mysterious matter from the other side, "Spooky". Unfortunately I do not think that to be the case.

Its simply a case of chemistry, and science can explain it all. When you apply laundry bleach to a stain, the stain disappears, and yet the bleach does not change colour. The same applies to acids. When you dissolve something in an acid, the acid does not change to the colour of what was dissolved, and yet we know that there was no magic in play.

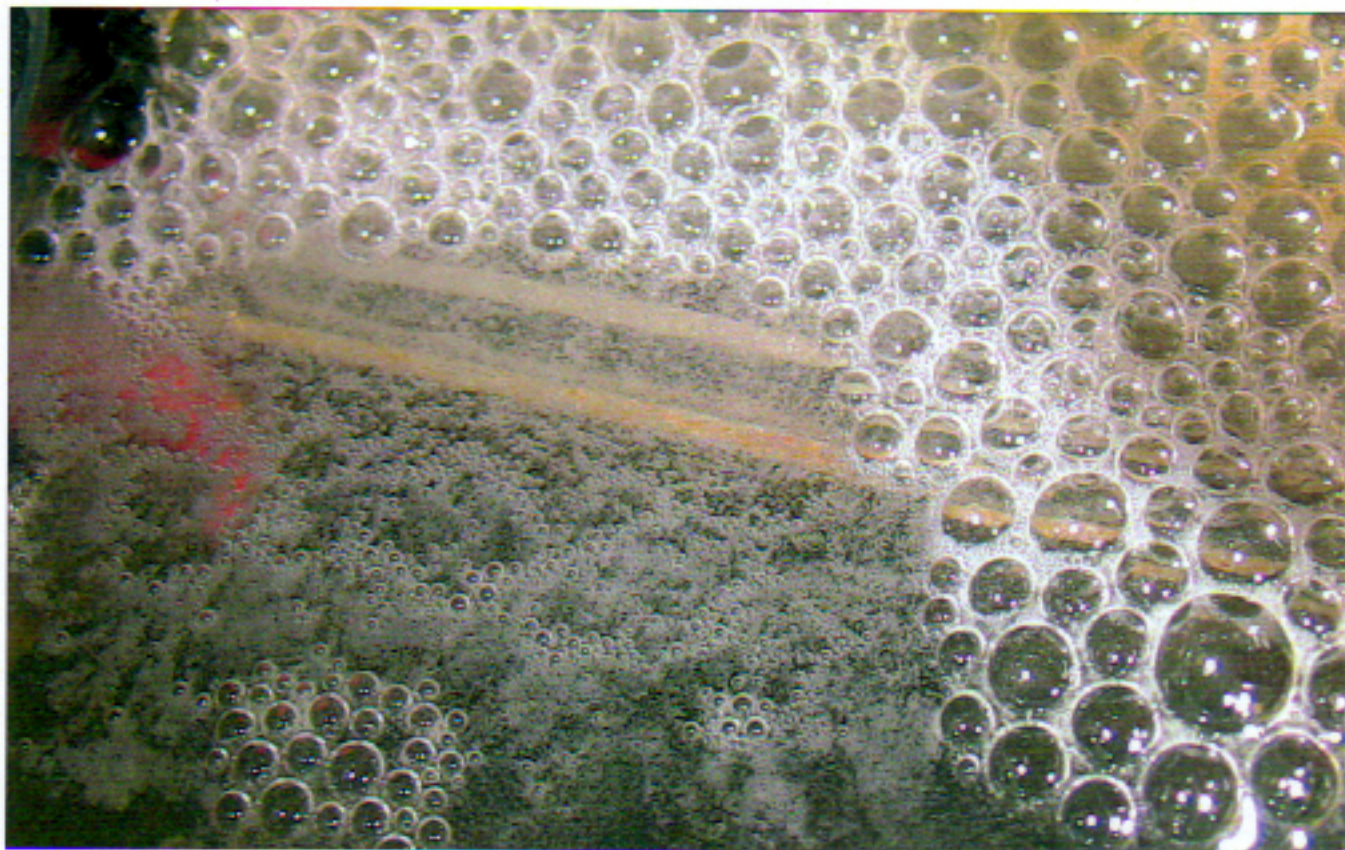
The particles that are dissolved in either the bleach or acid are simply dissolved in solution in a way that we can not see them, and this is the case with the material that is dissolved in water and bonded there by the electrical charges that the water molecules hold. Eventually by combination of the pH returning to normal and the charge of the water dissipating, the solids come out of the water and decompose. The term that we are all familiar with for this is "Stagnant water".



## Why Do We Need Bubbles?

The answer to that is simple, we do not, but as I explained before we have to have them. Surface bubbles are a side effect of reduced surface tension. Many that have worked on these cells will tell you that the surface tension increases as you charge the cell. This is only in the early stages of charging and is the result of the carbons produced from organic matter in the water during the electrolysis.

We do need to reduce the surface tension as this is an important component of charging the cell. Reduced surface tension means that smaller, finer bubbles of gas rise to the surface and disturb the water less than large bubbles. We are trying to create electrically charged polarized water. It will not happen if we over agitate it.





# Processing



From my experience, the common methods of charging water fails to remove many contaminants resulting in gunk in the cell. I have explored and tested many methods of refining and conditioning water to the point of suitability for use in the cell and I believe I have a successful process, although time consuming it offers a consistent result every time.



## Processing The Water.

Right up front I will say that all water seems to benefit from being processed and all water must be charged before being used in the cell. The cell is a device to enable us to use the energy, so do not wreck it by using it as a primary charging device.

### WARNING

When you place any voltage across a water cell, electrolysis occurs and a mixture of highly flammable and explosive hydrogen and oxygen gases are produced. Never charge or apply a voltage to a cell if it is sealed. Only charge in well ventilated areas. Never add any chemicals to the water unless you have a full understanding of what that chemical will do and the resultant gases that will be produced by the process of electrolysis. The picture on the right is the result of an exploding cell. The top of the cell was lodged in the ceiling and I could have been killed. Please DO NOT make the same mistake.



## Testing the Water

Before we go through the process of conditioning and charging water, there are a couple of tests that you can do to establish how suitable your chosen water is. As I have stated, almost any water will do, but some can take a lot more time to process and with simple, quick tests and calculation you can get an idea of where you stand from the start. Also to obtain better results you should read the sections on "Charging Power" and "Water Half Life"

## Why Process the Water Before you Charge It?

When you have chosen your water you will need to start the process of removing unwanted contaminants from it and charging it for use in the cell. This is a multi stage process that will take two or three days to do and is the most important stage in getting the cell working. Remember that the cell does not use water and you will be creating enough processed water to last you a very long time. As a part of this processing we are going to ionise the water. Why? Most water is formed from clusters of ten to thirteen molecules and ionising water breaks the water into two groups each having five to six molecule clusters. In this process half of the water will become more alkaline and the other half more acidic.

The process is also to do with electrons or the potential of the water. Water that has been ionised has more free electrons. If you measure the potential or voltage in almost any water, tap or fresh, you will find it to be positive in the range of 100 to 400 millivolts. When we have finished processing the water it will have a negative potential in the range -200 to -400 millivolts and this is what we need for the cell. A welcome side effect of this process is that many of the contaminants that are suspended in the water will simply come out of the water in the form of a brown gunk that will eventually settle on the bottom of the tank.

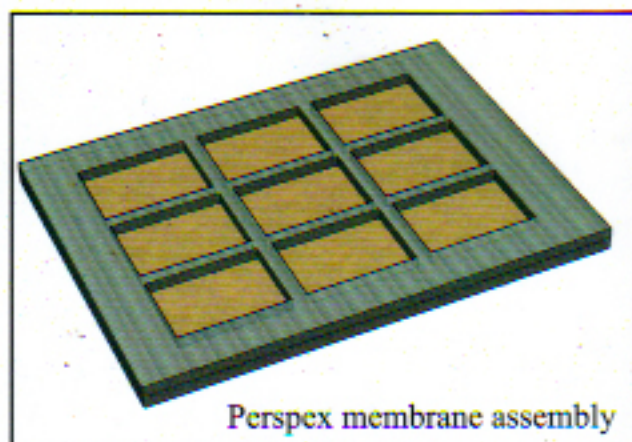


## Preparing the Tank

For the first stage of processing we use a fish tank. You will need to get a suitable size tank and make sure it is made of glass. Many small tanks are now made from plastic and although that may not affect the process, they will become stained and you will not be able to clean them without scratching and ruining the surface. **Once you use the tank for this purpose never use it for fish or storing any water for other than cell purposes. During this process toxic metals will leach from the stainless steel plates and deposit into the jointing material and glass.**

Normally you want to start with around 10 times the volume of water that your cell holds. If your cell has a 2 litre capacity you will need a 20 litre fish tank. That's not very large, so if you can produce a larger amount of water it will save you going through the process again if for some reason you choose to empty the cell and start over. Stored in a cool dark place, water processed to the final stage will last for a long time.

Firstly you need to place a membrane in the middle of the tank. To make this assembly I used two pieces of Perspex (acrylic sheet) cut to fit in the centre of the tank. I drilled a number of holes through both pieces of Perspex and placed an artificial chamois cloth between them as a membrane and bolted the two pieces together. The illustration on the right shows rectangles, this is far better if you are able to make it, as the more surface of membrane is exposed, the better. If you can obtain them, use plastic or nylon bolts. If not use stainless steel or brass bolts. You will have to place a blob of silicone on the ends of the bolts to stop them from conducting electricity from one side to the other.



Perspex membrane assembly

When you have made the assembly, place it as close to the middle of your tank as possible and silicone it in place. If you only silicone one side of the assembly you will be able to remove the other piece of Perspex to replace the membrane without having to remove and re-silicone the whole assembly.

Next you need six stainless steel plates. Two plates are used in the process of ionising the water and four are used for charging the water while it is still being ionised. It is better to use 316L grade stainless steel, but 304 will do and is more readily available and costs less. As is visible in the photo, in the past I have just clipped leads on the plates and placed them in the water, but to be honest its not good.

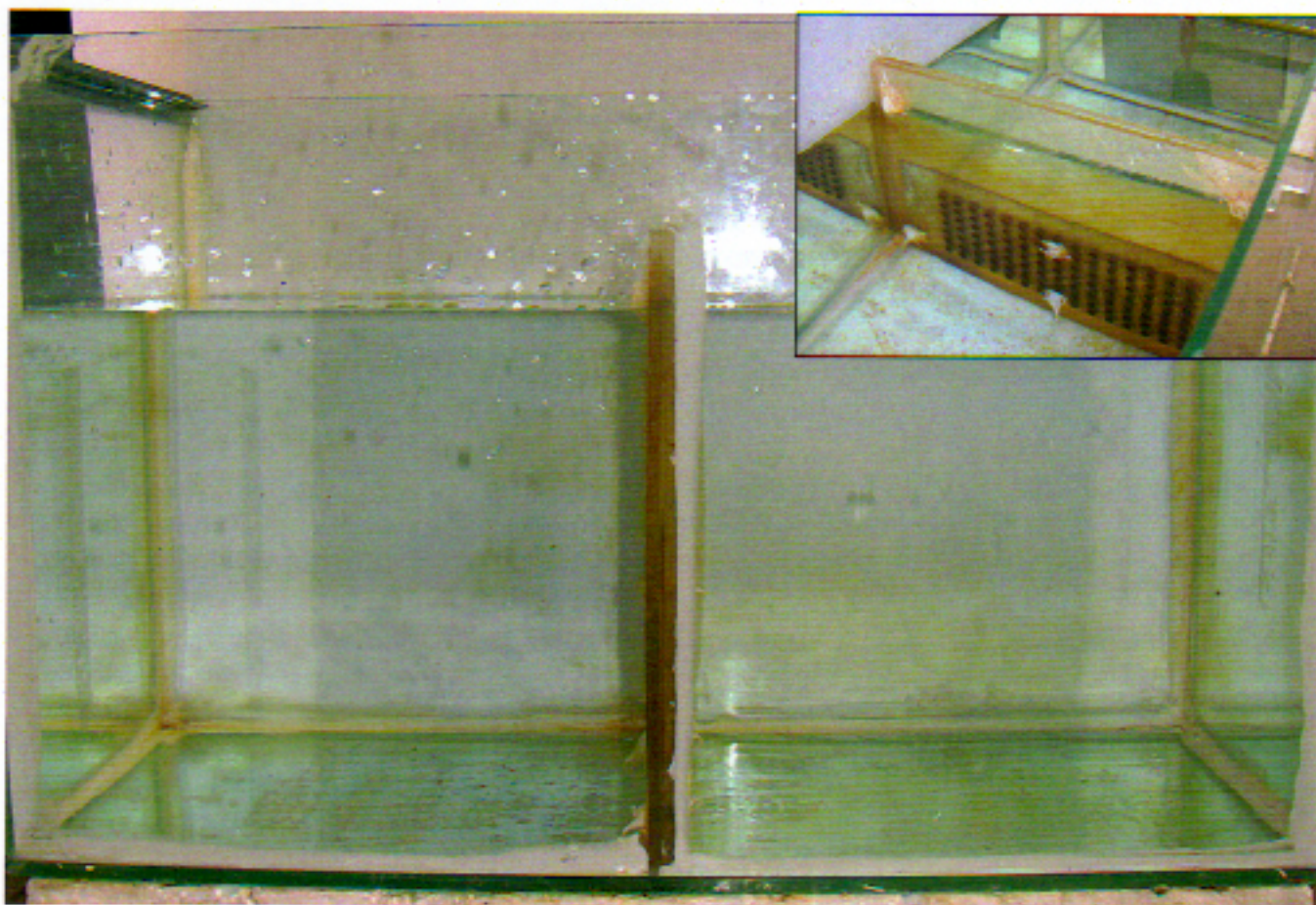


If your wires or connections are under water they will eventually be eaten away by the electrolysis and can introduce iron and therefore pollute the water. Your plates should have tags protruding to enable you to connect wires to them out of the water and ideally have some form of mounting brackets to keep them off the bottom of the tank, as this promotes circulation of the water. The plates should each be big enough to cover the area of the holes in the Perspex. In my case about 180 mm square.

If you find making the membrane assembly and cutting the stainless steel a little difficult you can buy a kit from [www.NUTECH2000.com](http://www.NUTECH2000.com). They have produced excellent plate assemblies and have Perspex membrane assemblies at very reasonable prices. They sell them as a complete water processing kit and the part number for it is WPK 001. I do not state the prices here as books last for years and the prices of stainless steel can change frequently.



Having now prepared your tank, allow the silicone to dry for at least 24 hours.



## Lets Start Processing

Place one of your stainless steel plates each side of the membrane and connect the leads to your battery or 12 volt power supply. Do not turn it on at this stage. If you are using a battery, even a large car battery may go flat over the duration of this process so you will need the ability to charge it. Personally I recommend a good power supply, maybe 10 amp 12 volts. You should never get anywhere near 10 amps but if you have a good supply you should not have to worry about it getting hot. I always connect the positive to the right hand plate. If you do the same, you should get the results shown in the pictures. If not, remember your results will be opposite.

Make sure you have a fuse in the battery and or power supply line and that the area is well ventilated at all times. The gases produced are at the very least explosive, and depending on chemicals or pollutants in the water, may be poisonous. Never add anything to the water unless you know exactly what will happen during electrolysis and what gases may result from your additive. Tanks and water containers can break or leak, so for this reason you should have any power supplies or electrical connections in a place that can not be affected should any water escape. It is likely that you will not be present during all of the processing time and therefore I recommend that you have a smoke detector in the area in which you are working on the cell or processing the water, even if it is in your garden shed.

Fill the tank with your chosen water until it is about 15 mm below the top of your Perspex. Note that the level of the water can rise slightly during processing and you do not want bubbles to be able to go from one side to the other, so do not over fill it.

Now, while monitoring the current, connect your battery or turn on your power supply. The current should be somewhere between 50 and 250 milliamp. If the current is higher place the unprocessed water in your cell and check the current. If it is much higher than that indicated by the "Charging

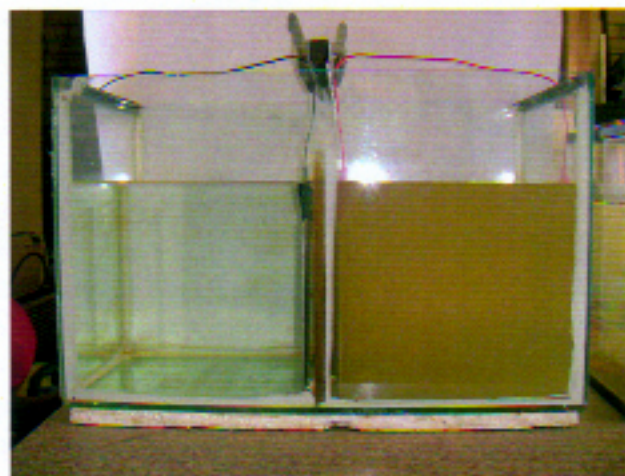


Power" formula, you will need to dilute your water with distilled water to reduce the current, however with natural water this is not usually the case.

If your current is too low then you will need to add an electrolyte. What electrolyte you use will depend on the pH of your water. If your water is slightly acidic (with a pH of less than seven) you can add vinegar. Vinegar is acidic and will lower the pH even further. If the water is alkaline (with a pH higher than seven) add some baking powder (sodium bicarbonate) to raise the pH further. The quantity of vinegar may be quite high, even as much as ten percent, while the quantity of baking powder is very small, not normally more than one or two teaspoons. When adding an electrolyte to the water, do so slowly and stir well before rechecking the current. It is better to add less and repeat the process, you can not take it out if you add too much. Personally, I prefer not to use an electrolyte. I have found that water with suitable conductivity is much better.

#### Step 1:

Having established that the current is within the desired range, we need to start the process of conditioning the water. This will result in fine bubbles coming from the plates next to the Perspex. It is not uncommon for one plate to produce more gas than the other. The negative plate produces hydrogen and the positive plate produces oxygen. Leave this for a minimum of 8 hours. Personally I leave it on until there is no further change or the water on the left starts to noticeably discolour, sometimes 24 hours or more.



As you can see in the photo, the side with the negative connected (left) should be clear and the side with the positive connected (right) will usually go cloudy or even very dirty depending on your water.

A little science; as earlier stated the plate connected to the negative will produce hydrogen gas and the plate connected to the positive will produce oxygen gas. In doing so the water in each side will have an altered balance. The negative side will have lost some of its hydrogen and therefore will have a relatively greater amount of oxygen, where the positive side will have lost some of its oxygen and will therefore have a relatively greater amount of hydrogen.

In the process of this change in balance, the depletion of oxygen from the positive side will cause the unwanted pollutants to drop out of the water. The side that has the negative and is effectively oxygen enriched will drop little if any material, in fact it will appear to get even clearer.

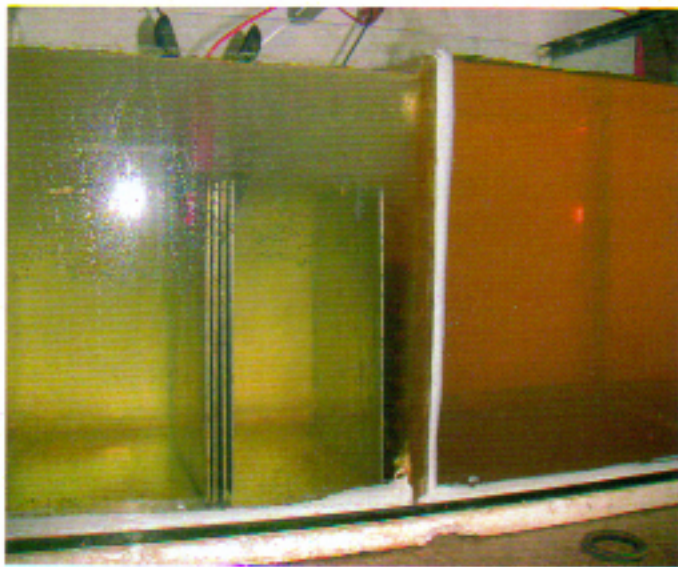
Note that in the process of ionising the water, the pH can change dramatically and it should be considered and treated as acid and alkaline. I have had readings as low as 2.5 acid and alkaline as high as 12. Use rubber gloves and eye protection when handling the water or placing or removing plates from the water. Although not a true acid or alkaline it should still be treated as such.

#### Step 2:

Although it does not seem to matter what side you charge first, I normally start on the clean side (the left). Turn off the power but leave the ionising plates where they are and add four charging plates in the centre of one side as shown in the photo. I simply clamp the four plates together with a plastic clamp and use four millimetre rubber spacers.

NOTE: The plate closest to the ionising plate should be of the same polarity as the ionising plate. If this is not the case, additional current will flow from the ionising plate and charging plate and this will affect the process. Next, reconnect your power supply and leave it on for at least two hours. You will notice far more gas coming off of the charging plates than is the case with the ionising plates.



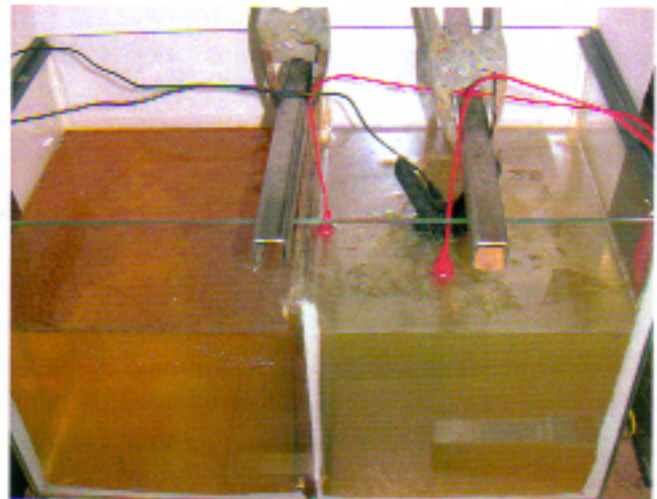


This is largely due to the fact that they are much closer and the full area of each plate is exposed to the other, where in the case of the ionising plates the Perspex presents a partial barrier.

Depending on the water quality the amount of material that this will produce can vary from a slight discolouration to an enormous amount of brown muck. In most cases you will have a thick skin like layer on the top of the water, a dark tint throughout the water and a different, fine layer of dirt on the bottom of the tank.

### Step 3:

Now turn off the power supply and move the charging plates to the other side of the tank. Again make sure the plate closest to the ionising plate is of the same polarity as the ionising plate. Turn the power supply back on and again leave it for at least two hours. After this stage, remove the charging plates and ionising plates and using a small container carefully remove what you can from the surface of each side ( pictured below). What is shown in the picture is typical of what I get from purchased spring water.



### Step 4:

Next, let the water sit until all of the particles have settled. This can take a day or two. If particles remain on the top after 24 hours gently agitate the surface and they will settle. Don't worry if the water has a slight tint as this will go in a later procedure. Carefully siphon the water out of each side simultaneously into separate containers (shown below). Important: label the containers so that you know what side the water came from. Take as much care as possible not to siphon any unwanted contaminants. If you wish

to preserve as much water as possible you can filter the last drop through paper towels or even coffee filter papers. I don't usually bother.

### Step 5:

When you have removed as much water as possible, empty and clean the tank and the stainless steel plates. You can use a scourer or wet and dry paper on the plates. If you do not get them spotlessly clean the surface will deteriorate and you will end up throwing them away. Remember to clean the edges as they can get very pitted.





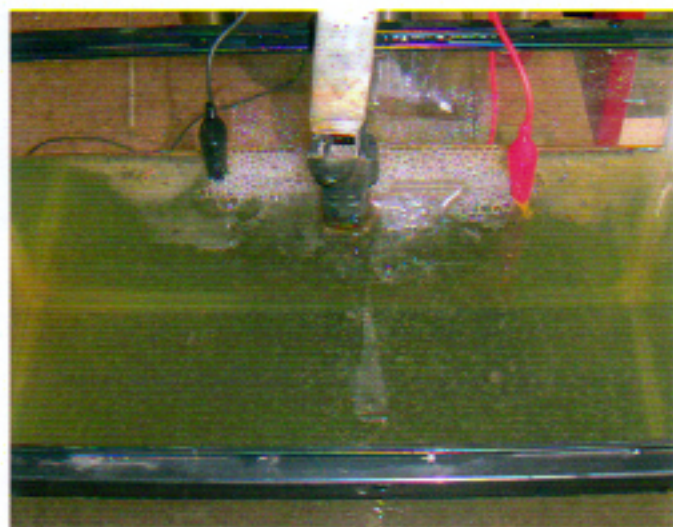
**Step 6:**

Pour the water back into the **opposite side** of the tank to where it came from. The alkaline water (negative side and left) now goes into the positive side (right) and vice versa. The reason for this is that we subjected one half of the water to a negative charge to remove contaminants that were hydrogen bonded and the other half to a positive charge to remove contaminants that were oxygen bonded. Now we are reversing them to treat the water to the opposite condition.

You will be quite surprised how much you get out of the water the second time round. This time both sides produce some contaminants. Again depending on the quality of your water this can range from water discolouration to huge volumes of gunk. I call it gunk because no one seems to have successfully analysed and established exactly what is coming out of the water. It is evident that it is absorbed into the water by way of pollution but when absorbed at that invisible level the structure of the particles change and it comes out in a bit of a jumbled mess.

**Step 7:**

Start the procedure all over again. As per Step 1, ionise the water for eight to twenty four hours. Then, as per Step 2, charge one side for two hours while still ionising the water. Then as per Step 3, charge the other side for two hours while still ionising the water. You should note a difference in the bubbles when charging the water this time. They will be finer than before and generally cleaner and whiter. This is the result of the process and what we need for correct cell operation. Next, as per Step 4, remove any contaminants from the surface and let it settle for 24 hours or so.



**Step 8:**

This is the final stage of processing and charging the water. Siphon the water from both sides of the tank into a single second container. I use a smaller fish tank but it can be anything large enough to hold the volume of water. Place two charging plates in the water as we did before and again charge the water for around two hours.

Believe it or not you will again get even more gunk from the water but nowhere near as much as you did in the first process.

When you have charged the water, leave it to settle and then siphon it in to your final water container. I siphon through a fish tank air stone for the final stage as this acts as a filter and slows down the siphoning process, disturbing the water less. If you are short of containers, thoroughly clean the fish tank and use it to store your charged water.

If anyone conducting this process has the ability to test and establish what this process produces, I would love to know. I have a suspicion that it will consist of mainly carbons from organic matter dissolved in the water and released by the process of electrolysis.





## Processing Summary

- Note Prepare the fish tank for processing. When building the membrane assembly have as much membrane surface area exposed as possible, electrolysis will not happen through the Per-spex. Your ionisation plates should cover the exposed area of the membrane.
- 1 Fill the tank with your chosen water to just below the top of the membrane assembly (12mm).
  - 2 Turn on the ionising plates that are either side of the membrane and leave them on for 8 - 24 hours and then turn them off.
  - 3 Place and connect the charging plates in the left hand side of the tank and turn on both the ionising and charging plates for 2 hours. Remember the negative ionising plate should be in the left hand side and the charging plate closest to it should also be negative. Turn off both ionising and charging plates.
  - 4 Place and connect the charging plates in the right hand side of the tank and turn on both the ionising and charging plates for 2 hours. Remember the positive ionising plate should be in the right hand side and the charging plate closest to it should also be positive. Turn off both ionising and charging plates.
  - 5 Remove all plates and let the water sit for at least 8 hours allowing any particulates to settle, the longer the better. If you have dirt floating on the top of the water, use a small container to scoop it off and gently agitate the surface until the remaining particulates settle.
  - 6 Now decant both sides simultaneously into two separate containers. Take care not to collect any of the settled dirt in the process.
  - 7 Thoroughly clean and dry the tank and all plates. You may need to use wet and dry paper, steel wool or a scourer to get the plates clean. They must be like new, even on the edges.
  - 8 Place the ionising plates back into the tank, connected to the same polarity as before and refill the tank with the water you earlier decanted. **THIS TIME PUT THE WATER INTO THE OPPOSITE SIDE FROM WHERE IT CAME.**
  - 9 Turn on the ionising plates and leave them on for 8 - 24 hours and then turn them off.
  - 10 As per step 3. Place the charging plates in the left hand side and charge for 2 hours.
  - 11 As per step 4. Move the charging plates to the right hand side and charge for 2 hours.
  - 12 As per step 5. Remove all plates and let the water settle for at least 8 hours.
  - 13 Decant the water from both sides into one container, again trying not to include any settled dirt or particulates.
  - 14 Place the charging plates into the container and charge for at least 2 hours.
  - 15 Allow the water to completely settle and you have finished the water charging process.



# Formula

When talking to others involved in the development of cells, it became apparent that no common dialogue or formula existed to permit the communication of information and findings. Without Ohms law the relationship of volts, amps and resistance could not be expressed. I present these formulas hoping they establish a common method of expressing and calculating conditions for a water fuel cell.



## Formula

The question of how much current, what voltage and for how long should you charge, has been a bit of a mystery with Joe cells from the beginning. For a long time a current of 1 amp was suggested. Many worked from 12 volts, which from Ohms law gives 12 watts, but could this work for all cells? I do not think so. If your cell has a 1 inch diameter cathode (centre tube) that is a short length of say 4 inches, then 12 watts is a lot of electrolysis and you produce quite a bit of hydrogen and oxygen gas, in fact more than we want. If on the other hand your centre tube is 2 inch diameter and is also longer, the surface area is many times greater and therefore the dissipation of power is much greater and the effective level of electrolysis per given area is much lower.

What I have done is produce two formulas, firstly the "Charging Power" formula that compensates for the size of the cathode and gives the ability to be consistent in effective charging, whatever the size of the cell, and secondly the "Charge Duration" formula that formulates the duration of charge. They also give people the ability to compare relative charge rates and results even if they have vastly different cell sizes, voltages and / or currents.

### Charging Power Formula

$$\text{Charging power} = \text{Surface Area} \times \text{Watts}$$

Lets break down the above equation and calculate the values using some examples. The first part of the equation is Surface Area. This refers to the surface area of the cathode (centre electrode) and is calculated by the formula (Circumference x Height). Circumference = diameter of the cathode multiplied by Pi or 3.142. If in this example the cathode = 1 inch, the circumference would be ( 1 x 3.142 ) = 3.142 inches. I use inches, as all of the stainless tube I have found comes in inches. Next the height: The height is simply the length of the cathode, in this example 8 inches. So therefore the first part of the equation will be:

$$\text{Surface Area} = ( 3.142 \times 8 ) = 25.136 \text{ square inches}$$

We do not need to be that accurate, so lets call it 25 sq. inches. I believe the ideal charging power is somewhere around 0.5 watts for each square inch of surface area of the cathode. So to put it all together:

$$\text{The charging power will be } ( 25 \times 0.5 \text{ Watts} ) = 12.5 \text{ Watts}$$

How many watts are you getting? The formula to calculate wattage is simply ( charge voltage x charge current ) so therefore if your supply voltage = 12 Volts and your current = 0.5 Amp the power = 6 Watts and if your supply voltage = 12 Volts and your current = 1 Amp the Watts = 12 Watts

This is not an exact requirement. If the wattage is way too high you will have far more electrolysis than needed and will heat up the water and deteriorate the surface of your stainless steel. If the wattage is too low it can take a very long time to charge the cell. For a cathode of 1 inch by 8 inches I would be happy with somewhere between 3 and 15 watts, but no more.



## Charge Duration Formula

Charge duration is based on a formula that relates a standard charge power and time. If the current going through your cell is exactly that of the above charge power formula, then your charge time will be one minute. This is rarely the case, however, I have established that providing you adjust the duration of charge to compensate, you give the cell what is effectively the same charge and the outcome will be the same as if you had the ideal charging power. The formula is simply:

$$\text{(Ideal Charge Power / Measured Charge Power)}$$

So therefore: If we had a calculated ideal charge power of 5 watts and our actual measured charge power was only 2.5 watts, then our formula is  $(5 / 2.5) = 2$ , and our charge time would be 2 minutes. If on the other hand our actual measured charge power is greater than the calculated charge power, say 10 watts, we would have  $(5 / 10) = 0.5$ , thus we would charge for 0.5 of a minute or 30 seconds. I have also established that with durations of less than 20 seconds, insufficient reaction takes place in the cell, so I recommend that the minimum charge duration be 20 seconds.

### Water Half Life First Charge Voltage

Place your unprocessed water in to your cell, apply the negative to the centre cathode at the bottom and positive to the outer container at the top and apply 12 volts for a period of one minute. Disconnect, then wait for a further minute and check the voltage across the cell. This is the full charge voltage, write it down as you will need it later. Wait a further four minutes and again check the voltage across the cell. This second reading is what we call the half charge voltage, you will use this voltage during the charging process so write it down. If this reading is less than half that of the first reading, it may be better to try another source of water. All good waters seem to yield a voltage of sixty to seventy percent of the first reading.

If the voltage is below half, water can be charged, but it will take you longer and yield more gunk than you want. It is hard to give you an exact rule of thumb as to the quality of water to use, other than simply saying the higher the half charge voltage the better the water. If you have several waters available try them all and use the best. The other thing to note is that the purest water is not necessarily the best to use. The best is a component of changeability and water quality. Pure water would not conduct electricity and therefore could not charge or have a half charge. Although half charge voltage gives you a good indication of water quality it is not something that you can easily communicate with others as it is a single component of the two readings. Saying what the half charge voltage was, does not mean much unless you relate it to the first reading, whereby a comparison can be made. Some people have asked me why not use the next method "Half Life Time" to start with and the reason is simple, when you first charge a cell it is a very weak charge. Just the small amount of current drawn by even a good digital multi meter is enough to drain the cell in only a few seconds. If you tried to conduct multiple tests to establish the point at which the voltage was half that of the first reading you would get false results as you would have flattened the cell in the process of measuring it.

### Half Life Time

I needed to have a method of establishing the progress of charge within a cell and the ability to communicate that progress. What I found through hundreds of hours of monitoring with the



computer and a purpose built high impedance interface, was that the time taken for the cell's voltage to drop to half after charging, increased proportional to the charge state of the cell. Now with a simple measurement, I had a value that related to the cells charge state or condition. That measurement was the **Half Life Time**; the time that it takes for the cell's voltage to drop to half of the one minute voltage. When we do the first charge test we wait four minutes between voltage tests as that is a general point where the charges in most water has diminished to somewhere around or just above half. After many charges it will take hours for the voltage to drop to half.

It is important to note that the only time the half life duration will get less is if the cell is leaky. I have had cases where **Half Life Time** has progressively increased to as much as two hours and then on the next test is down to a few minutes. It is usually due to a leaky spacer, where the spacer conducts electricity and flattens the cell.

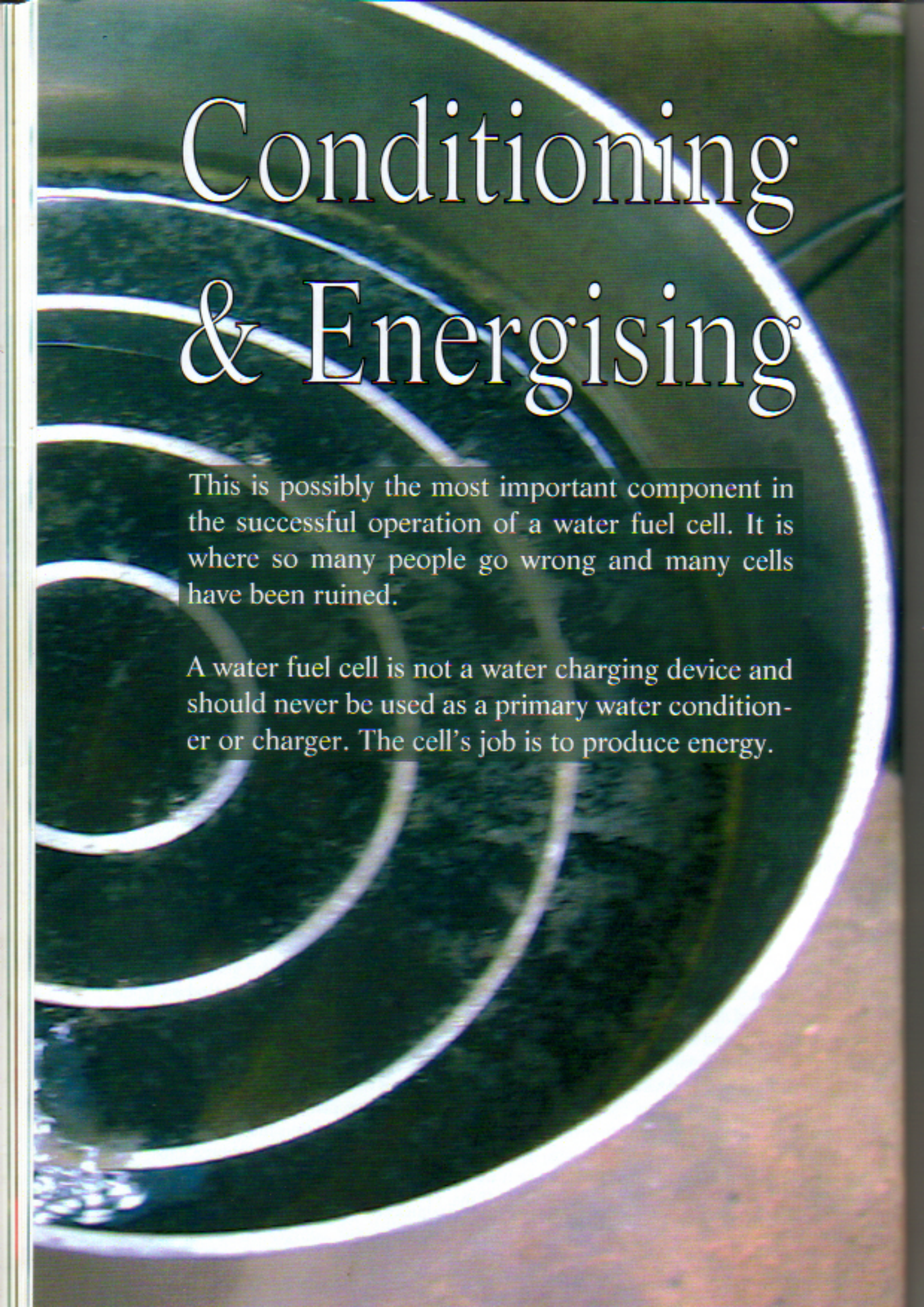
How do you measure half life voltage? Well to start with you do not. You need to do three or four charges according to the charge time formula at about thirty minute intervals to establish a stronger charge first. Then you can do voltage tests periodically to establish the Half Life Time . After a charge, wait thirty minutes and then check the voltage across the cell. If it is below half of the full charge voltage that you established when first setting up the cell then charge it again. If the voltage is not below half, test the voltage again in ten minutes. Note that the Half Life Time should always be increasing, that is the time between charges is getting longer. So if the time between the last two charges was say thirty five minutes, you need not even test it until thirty five minutes after the last charge. I do not know if my findings on increasing charge durations are consistent with all cell types, but I find that generally the duration between charges increases by about nine percent for every charge.

I have designed two automated charging modules for the cell. The first is a computer interface that gives you the ability to modify all parameters and log data as you develop your own process. It can also run in a fully automatic mode of either voltage sampling, time based charging or both. This module comes with all software. The other module is a stand alone PIC microprocessor based unit that simply implements all of the formulas provided in this book. The only input you need to provide is the ideal charging power, as it cannot know the size of your cell. Both devices provide an accurate indication of cell state and indicate if your cell is leaking or something has gone wrong. Based on the understanding that when a cell has reached the highest charge it is going to reach, the interval between charges will be constant, both modules indicate when the cell is fully charged.

## Normal Cell Voltages

Many have asked me what voltages are considered normal in a water fuel cell. Based on what I have observed and in comparison to other forms of batteries, I came to the following conclusions. Normal batteries do not take a charging current until the input or charge voltage rises above their normal terminal voltage. A car battery has a terminal voltage of between 12 volts when flat and 12.66 volts when charged and as the input rises above the terminal voltage, charge current increases rapidly. If we apply this to the cell we can apply a voltage of 800 millivolts per neutral or per gap before any significant current follows, thus the nominal voltage would seem to be 800 millivolts per gap. If a cell has two neutrals and therefore three gaps, the point where charging will occur would seem to be 3 times 800 millivolts or 2.4 volts and a typical full half life for such a cell would be half that (1.2 volts).





# Conditioning & Energising

This is possibly the most important component in the successful operation of a water fuel cell. It is where so many people go wrong and many cells have been ruined.

A water fuel cell is not a water charging device and should never be used as a primary water conditioner or charger. The cell's job is to produce energy.



## Getting the Cell Working

**This is without doubt the most important statement in the book!**

In the same way that you condition and charge water before you put it in the cell, you must condition the cell before attempting to do anything with it. The water that first goes into the cell and the electrolysis that takes place is only conditioning the cell. When your cell is conditioned you place fresh charged water in it and then you energise and maintain it, you do not charge it. Many look at the cell as a water charging device and that is largely due to the terminology used. The surfaces of the cell are too important to damage by just charging water and it is much harder to strip and clean a cell than the plates in the charging container.



### Conditioning the cell

**DO NOT HAVE THE TOP ON THE CELL FOR THE CONDITIONING STAGES**

When we apply a voltage to the cell gasses are produced. The claims that we produce Browns gas, HHO or any kind of implosive gas are without basis. The ratio of hydrogen to oxygen gas will be determined by the pH of the water and many other factors. In some circumstances you could produce primarily hydrogen gas and in every circumstance you should consider the gas to be highly explosive. Only condition the cell in a well ventilated area and with the top of the cell open. When we later apply a energising or maintenance voltage to the cell with the top on, the cell must have an open vent that feeds through a hydrogen flashback arrestor and even the output of the flashback arrestor must be fed to a totally safe discharge point where gasses coming from it can not be ignited. I only ever apply a voltage to a closed cell that has a certified hydrogen flash back arrestor in the vent line. If you do not follow these warnings you are looking for disaster.

I except no responsibility for any damage, loss of property, injury or death as a result of involvement or replication of any or all of the procedures in this book.

Having given consideration to all safety procedures lets look at the process of conditioning the cell and getting it ready to operate.

By conducting many computer controlled tests I established that the initial stage of conditioning is primarily establishing consistently polarized and conductive surfaces on all of the components of the cell. Throughout the conditioning stages the cell should be as close to plumb as possible. If it is not, bubbles will not rise evenly around the cylinders and the cell will not be evenly conditioned.

From normal electrolysis applied across the entire cell, the cathode having the smallest surface area and relatively more power per given area, is conditioned first. Then progressively the neutrals and finally the anode or case. What we can do is balance the procedure and save a lot of time and unnecessary deterioration of the cathode. We do this in three simple stages.

**These procedures are only for a new cell in the conditioning stage, miss Steps 1 to 3 for a cell that has been conditioned, even if it has been emptied and cleaned after conditioning.**



**Stage 1.** Connect the negative lead to the cathode and then fill the cell to about 10 millimetres from the top of the outer case with charged water, well over the neutrals. Now connect the positive lead to the top of the first neutral. Turn on the supply and leave it on for only 30 seconds. Gas will only come from the gap between the cathode and first neutral.

Then turn off the supply and move both the negative and positive leads out one step, so that the positive lead is on the second neutral from the cathode and the negative lead is on the first neutral, closest to the cathode. Turn the supply back on for 60 seconds. We double the time to compensate for the increased surface area of the neutrals. This time you should only have bubbles coming from the gap between the first and second neutral.

Three or more neutral cells only:

For each additional neutral simply move the leads outward one more step following the prior procedure and turn on the supply for only 60 seconds. As there is little difference between the surface area on the neutrals we do not need to increase the conditioning time.

Conditioning the case:

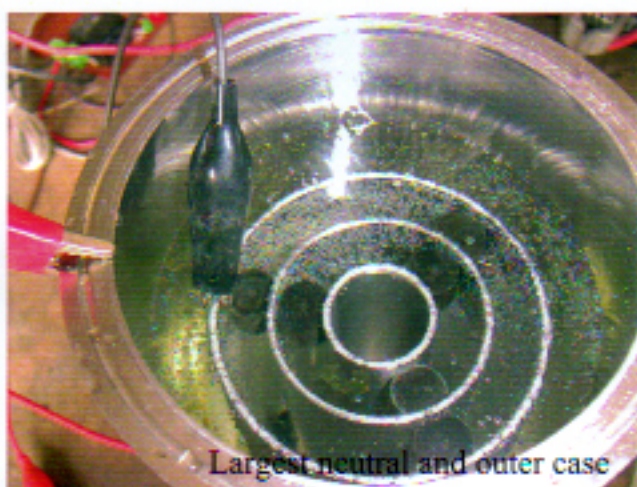
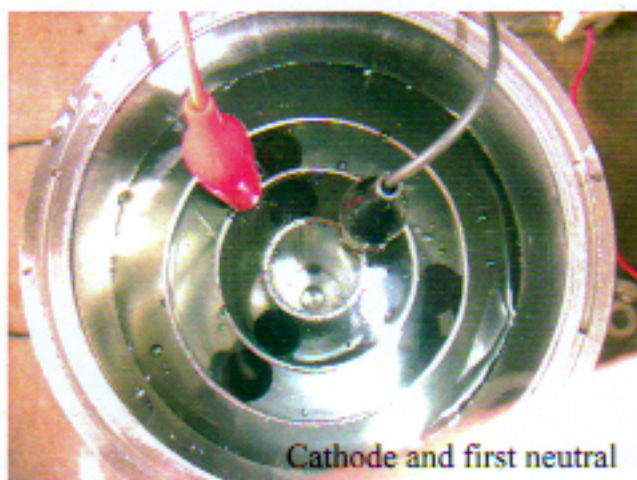
Connect the positive on to the outer case and the negative on the largest neutral, turn on the supply for only 90 seconds.

Due to the release of microscopic particles of metal coming from the surface of the new stainless steel during this initial stage, if there is any discoloration the water should be discarded and replaced with fresh charged water.

**Stage 2.** For this entire procedure we connect and leave the positive connected to the outer case.

Connect the negative to the largest neutral and turn on the supply for 30 seconds. Then turn off the supply and move the negative to the second largest neutral and turn on the supply for a further 30 seconds. Turn off the supply and again move the negative, repeating the procedure and turning the supply on for 30 seconds until you have done all neutrals and the cathode (centre tube).

Now pour the water out of the cell and throw it away. The reason we dispose of this water is it will again most likely contain further microscopic particles and contaminants from the surface of the stainless steel and during the process we have created conditions that will greatly affect the charge



within the water. It is important to note that we



If dirt forms strip and clean the cell



use charged water for these stages as non charged water is going to yield heaps of gunk and dirty your cell and that will mean stripping and cleaning it. It is of paramount importance that the water remains clean throughout all stages of conditioning. **If any brown gunk starts forming on the surface your water is not properly processed or charged, so put it back into your charging container and recharge it.** The cell is not the place to charge or process water and whatever happens we do not want to dirty the cell or you will have to strip the cell, clean all surfaces and start again. We started with 10 times the water your cell holds and even if you lost some during the stages of processing you should have enough processed water to fill several cells.

### Stage 3 Cell Conditioning:

This stage is simply establishing that you have correctly conditioned the cell thus far. Connect the negative to the bottom of the cell and again fill it with charged water to about 10 millimetres above the neutrals. Wait for 5 minutes to allow the water to totally settle. Now using a digital multi meter, quickly check the voltage across the cell from the bottom protruding cathode stud to outer case. You should have a minimum of 900 millivolts for a two neutral cell and 1.2 volts from a three neutral cell. If not, pour the water back into your charging container and recharge the water, let it settle and try again. Connect the multi meter for the shortest time possible to measure a voltage. If the meter is connected to the cell for more then one or two seconds it will discharge the cell.

If you did not have the minimum voltages across the cell even after recharging the water the problem is the cell. Go back to Stage 2 and repeat the procedure. Assuming you now have the minimum voltage across the cell, let it sit with the negative connected for about 20 minutes. We need the particles of charged water to align with the lightly polarized surfaces of the cell created during the prior procedures. Your negative lead should remain on the cathode from here on and should only be removed if you are going to empty the cell or fit it to your engine.



## Energising the Cell

During this stage we do what many have referred to as charging the cell. What we are doing is to cause the hydrogen / deuterium to migrate into the crystalline structure of the metal. Remember the water is fully charged when you place it into the cell, so we are not charging it, we are energising the cell with it.

Some might be wondering why not just connect some voltage and leave it on until the cell is energised? My analogy to that is simple! If you take a large piece of metal and apply an enormous heat to one side, such as a welding torch, you will melt and destroy that side before the heat even has time to go

through the metal and heat the other side. This is why we are able to weld metal. Our energy moves slowly through the metal, even slower than heat and by applying more than can dissipate, we only deteriorate the surface, create heat, gas and needless electrolysis. Slowly is the only way to go.



Firstly let's consider what is happening during this stage, how we can measure the energy and why the cell acts in part like a battery. As I stated in the section "How it Works" I believe the hydrogen / deuterium migrates into the crystalline structure of the stainless steel, and this being the case what we have is a partial hydrogen fuel cell. In a fuel cell we apply hydrogen gas to one side of a membrane and oxygen to the other. In the water fuel cell the water acts as a membrane. A potential is developed by the presence of hydrogen on the inner surfaces of the neutrals and case and oxygen on all of the outer surfaces.

When we first start to energise the cell the surface charge dissipates relatively quickly and this is apparent by the voltage or potential that we can measure across the dropping off over only a few minutes. As the metal becomes saturated over time the voltage will be sustained for much longer, in most cases for many hours. I refer the voltage and time components of its decay in the formula of Half Life Time.

As we periodically apply a voltage to energise the cell, we cause further migration of hydrogen /deuterium into the crystalline structure of the metal and eventually saturate the metal to the point that it is fully doped and we will only absorb more as the hydrogen/deuterium as it dissipates either atmospherically or in to the engine. For those whom have had experience with cells and have followed the Orgone theories, I believe the Orgone accumulator to be little more than a barrier to prevent dissipation into the atmosphere and if connected and maintained properly is not necessary.

Back to the procedure of energising the cell!

From the "Charge Duration Formula" calculate how long you should apply the energising voltage for, then as explained in "Half Life Time" establish the time between energising. The process can be very time consuming but once you get the hang of it, quite simple. Let's assume that the "Charge Duration Formula" suggests you apply the 12 volts for 90 seconds, so you apply the voltage for 90 seconds and then you wait and periodically test the voltage as per "Half Life Time" until it had dropped to the cell's "Half Life Voltage" and then recharge it. Repeating the procedure until the "Half Life Time" stops increasing. At this point your cell is fully energised and you will only need to maintain it.

You can maintain the cell by placing a 1.5 volt torch battery across it or by a short charge every time the cell falls below its "Half Life Voltage. If you have trouble with this final process you can take the easy way out and purchase the jMAX cell energizer control unit from [www.nutech2000.com](http://www.nutech2000.com).





# The Engine

Here I attempt to provide an explanation of the basic operation of a standard four stroke engine and explain the modification I have made to optimise it for a water fuel cell. Although my modification will not be suitable for all engines the basic principals are.



## The Engine

I wanted to be able to conduct tests and gain a full understanding of what the cell was doing and how it was affecting the engine, so as I mentioned earlier I set up an engine on my bench. If you just have an engine with nothing connected to it, it's hard to estimate the power being produced. If you have an engine with a load and in my case the load was a generator, it makes it easy to get some idea of the power.

If you are able to run powerful lights for example and you have no petrol going to the engine it's not long before people get very intrigued and even the most sceptic of them start to take a closer look. Unfortunately the standard engine will not work well with a water fuel cell. The main changes are to do with the ignition or spark timing. When running on the cell you need to advance the timing and have the spark occur much earlier than is the case with an engine running on petrol. Before I go into the modifications, I will first explain, for those that do not know the basics, how a four stroke engine works and this will help you relate to the changes and understand why we need to make them.

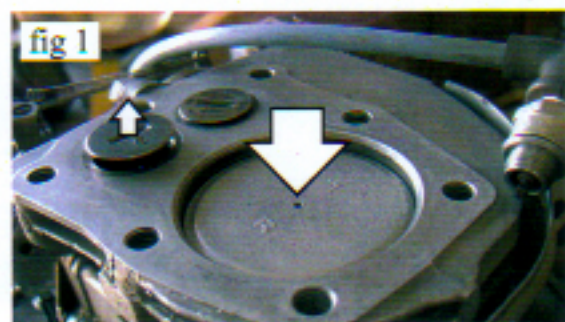
A four stroke engine, as its name suggests, has four different strokes in a complete cycle. Each stroke is the piston going from either top to bottom or bottom to top. The start of the cycle in an engine is the inlet stroke. This is where the engine draws in the air/fuel mixture.

### Stroke 1:

Starting with the piston at the top the turning crankshaft starts to pull the piston downward (fig 1). As the piston starts to move down, the inlet valve opens fully and the air/fuel mixture is drawn into the cylinder. I should point out, before mechanics say that I am wrong, the valve timing slightly overlaps different strokes to improve engine efficiency, however it only complicates the explanation and is not something I need to explain. When the piston approaches the bottom, the inlet valve starts to close and by the time the piston is at the bottom the valve is almost fully closed, completing the first stroke of the cycle, the inlet stroke (fig 2).

### Stroke 2:

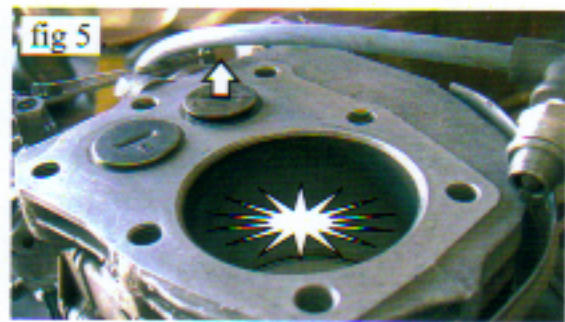
The second stroke is the compression stroke. The turning crankshaft pushes the piston upward, compressing the fuel/air mixture in the cylinder (fig 3). The mixture is compressed to make it burn faster. It is to do with the speed of the fuel burning that we need to do more. The spark that ignites the fuel actually happens during the last portion of the compression stroke (fig 4). This is what is meant by an advanced ignition timing. In this engine the standard ignition advance is fixed at about 15 degrees. That means the spark occurs when the crankshaft that is driving the piston is 15 degrees before the point where the piston would be at the top, called top dead centre. From when the spark happens it takes milliseconds for the burn to propagate through the fuel and we need that to happen before we use the energy on the next stroke of the engine. In larger engines the spark timing changes with engine speed and it often ranges from 8 degrees at idle to 30 degrees at high engine speeds, but in simple engines like this one that is not the case.





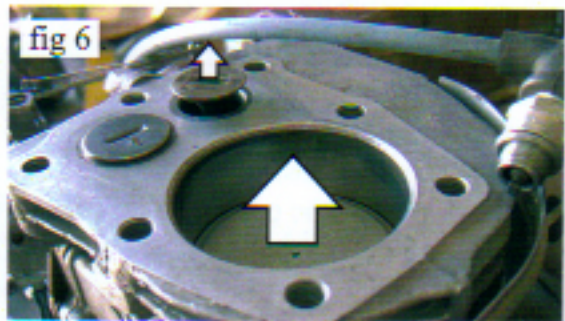
### Stroke 3:

The third stroke is the power or combustion stroke. This is where the burning fuel pushes the piston down from top to bottom, thus causing the crankshaft to turn and providing the power from the engine. When the piston approaches the bottom, most of the power from the fuel is spent and at the very bottom of the stroke the exhaust valve starts to open (fig 5).



### Stroke 4:

The fourth and final stroke of the engine cycle is the exhaust stroke. Starting with the piston at the bottom, as the turning crankshaft pushes the piston up, the exhaust valve opens fully and the piston pushes the spent fuel out (fig 6). If all of the energy of the fuel had been used, an engine would be almost silent. Unfortunately that is not the case. As the exhaust valve opens there is still pressure from the combustion and that pressure is released and this is what makes the exhaust noise. I point this out because it is different when the engine is running on the cell. Just before the piston gets to the top, the exhaust valve starts to close and when the piston is at top dead centre the full cycle is complete and starts all over again (fig 7).



Having explained what normally happens in the cycles of a four stroke engine, let's look at the changes we need to make. The main change is to the ignition timing. This alone proves the effects of the cell and is the part that any mechanic will agree is out of the ordinary. We mentioned in the prior section that the spark normally happens just before the piston gets to the top on the compression stroke (advanced spark timing). Any mechanic will tell you that if the spark is too advanced (happens too early) the force of the combustion will stop the piston rising and the engine will stall. Let's put it into perspective, the piston is driven by the crankshaft and the crankshaft rotates. When we are talking about a normal advance of say 8 degrees, that means the crankshaft has only to turn a further 8 degrees before the connecting rod that drives the piston is as high as it is going to go. In reality the amount of vertical movement that 8 degrees represents is extremely small, we are only talking a distance of 1 or 2 millimetres from the top of a stroke. When the crankshaft rotation is only a few degrees before top dead centre, the piston, connecting rod and crankshaft are almost in line and resultant torque is not enough to cause a problem.

Most mechanics would consider an advance of 20 degrees to be about the limit for a normal engine to idle and it would idle rough at that. The reason we are so interested in spark timing is because for an engine to run a water fuel cell we need the timing to be adjustable and need the ability to advance it to as much as 80 degrees before top dead centre. That is, we need to advance it to where it can not run on petrol. Why? Because the engine runs slightly different when on the energy from the cell and this is covered in the section "How it Works".





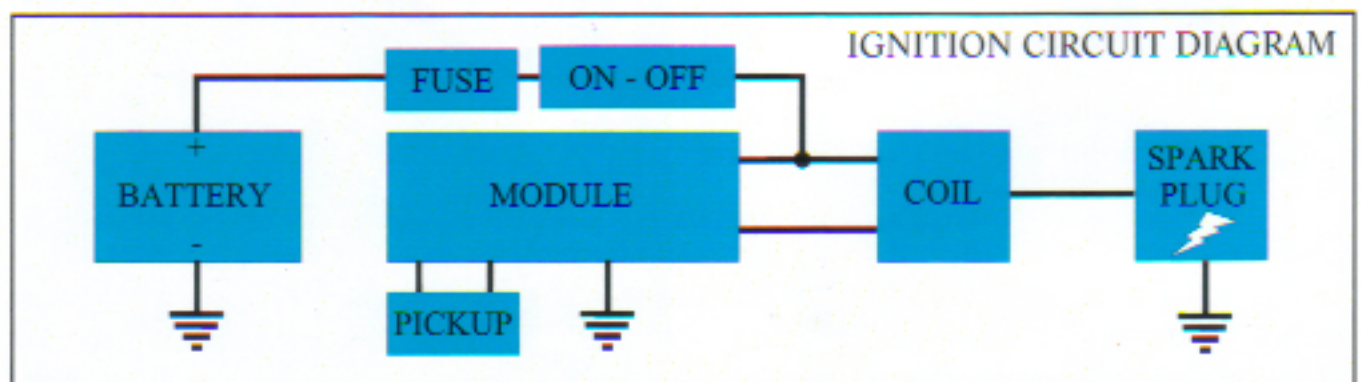
## Modifying The Engine

My first modification was to change the ignition timing of the engine. I also needed to make the timing adjustable so it could go from petrol to running on the cell. Most small 4 stroke engines have an induction type ignition system, where a coil is energized by magnets in the flywheel and a set of contact points open at the correct time causing a large electrical spike called a back EMF, and that spike travels to the spark plug to give you the spark.

The advantage of this system is that it is simple, reliable and works well. The disadvantage is that it does not work well at extremely low engine speeds. Engines running on a water fuel cell are reported to idle as low as one revolution per second, or even less. The other disadvantage is that it is physically difficult to modify an induction type ignition system. To make it adjustable we would need to make the points and the position of the induction coil adjustable. By changing it over to electronic ignition, I could overcome the problems of low RPM and also would only have a magnetic pickup to adjust in order to change the timing. My first modification was a little rough and hard to adjust, that's why I

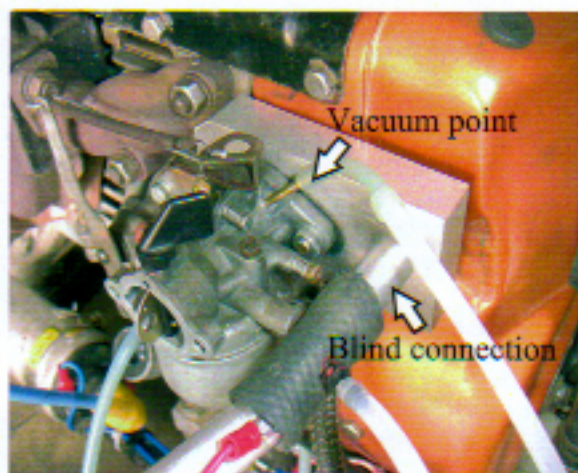


purchased the milling machine. As shown in the above picture I milled a new guide plate and then a brass slide to fit it. On the slide I mounted the magnetic pickup and could now easily adjust the timing from a few degrees before top dead centre to about 90 degrees before top dead centre. The electronic ignition system I used was from an Australian Ford Falcon which uses a simple 4 wire device, magnetic pickup and good old fashion ignition coil. You can see the circuit diagram for the configuration below.

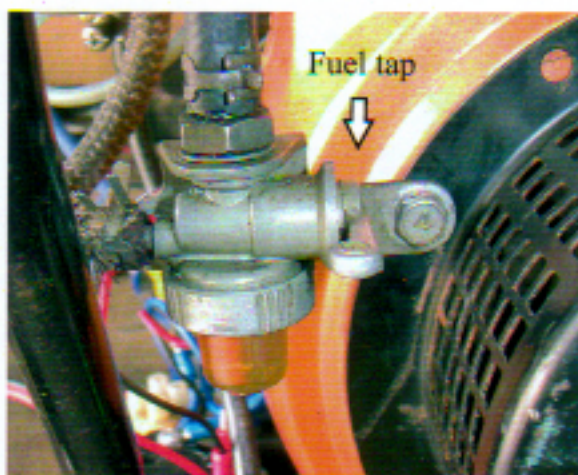




I had some problems with my connecting tube coming off the point that I used for a blind connection. Now having a milling machine I decided to machine a plate to go behind the carburettor and provide a perfect connection point. As described in the section "How it Works" you will note the cell connects primarily to a blind connection. Meaning there is no hole for gases to enter the engine. The energy enters the engine by entering the crystalline structure of the steel or alloy. This blind connection system is used for all water fuel cell connections, whether you use solid rod, cable or tubing and is explained in detail in the "Connecting" section.



In most instances there is a secondary connection to the cell from the motor. This is by way of a small vacuum tube to place a vacuum on the cell and ensure that any gases produced by way of the electrolysis are disposed of safely. Ideally you would have a small connection into the intake manifold. Never use a vacuum connection unless you have a suitable flashback arrestor in-line.



The other modification that I made was simply to move the fuel tap to a more convenient location. Where it was mounted you could easily turn it on and off but could not easily see if the filter bowl was full or empty and I wanted it so people could see at a glance what it was set to. You might be wondering why do I need a fuel tap if the generator is going to be running on the cell. Well the answer is simple, I have never managed to start the engine on the cell. It is a pull start engine and there is a limit to how many times you can pull it without getting a sore arm. My process has always been to start the engine on petrol and let it run for a minute or two to warm up. I found that as it warmed up, I could slowly move the timing until it was about 70 degrees before TDC and then turn off the petrol.

It is important to also note that I have never heard of an engine that has simply run from a water fuel cell without an initial changeover period. It might be that you run it on petrol for several hours, progressively adjusting the mixture and ignition timing until the point that the engine has accumulated enough energy to operate from the cell alone.

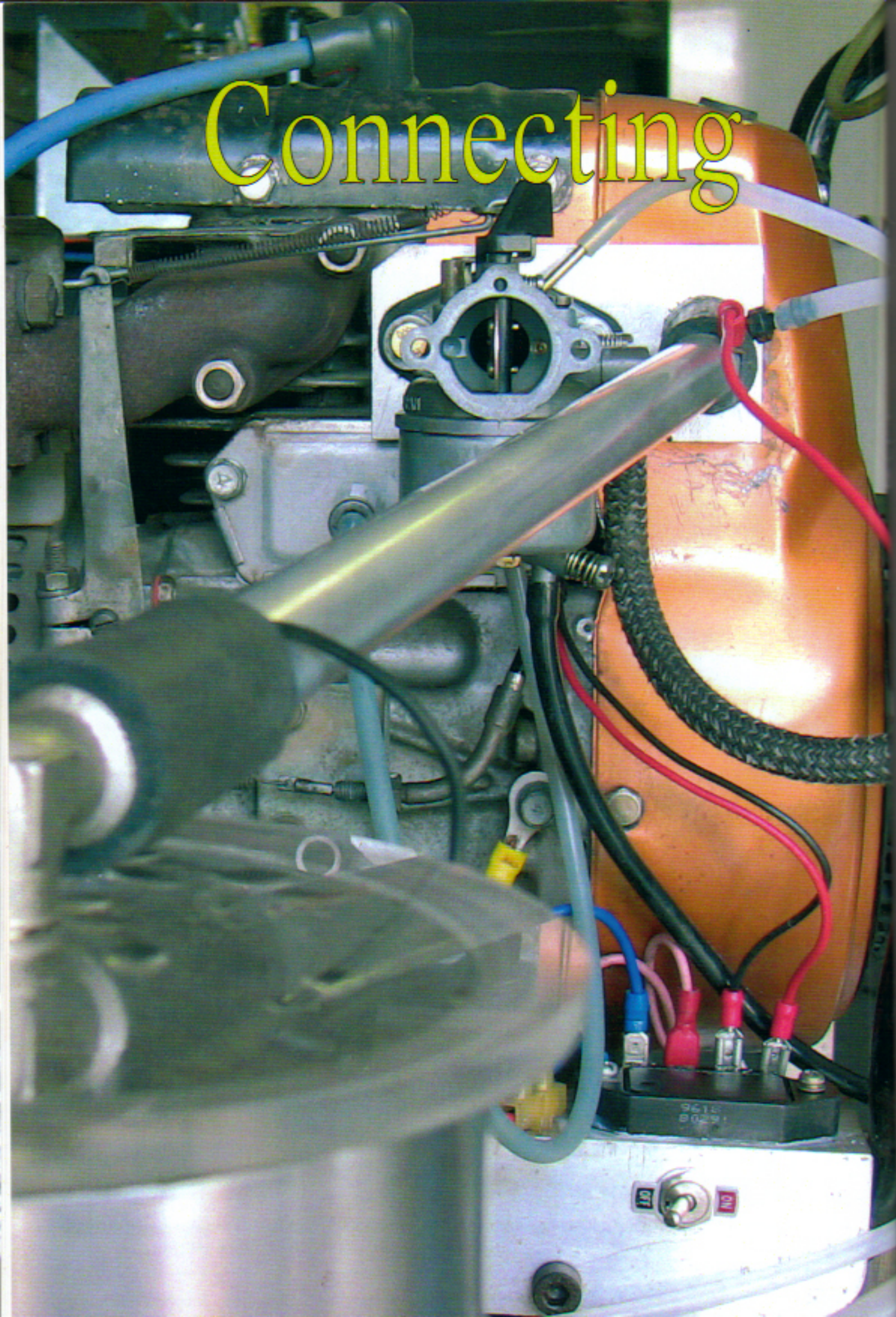
Many have also reported that in the first instance of conversion, engines will only run at high speeds. If you do not have the ability to start on petrol you will not get to high speeds for the cell to kick in. Make no mistake, this is not a simple do the conversion and have free energy system, far from it. There are many variables and if everything is correct it can still be hit and miss.

Once you have installed the cell, the engine will be effected by the energy from the cell even if the cell is removed. Described in "How it Works" the crystalline structure of the metal will be doped with the hydrogen / deuterium, and while any doping remains the metal, engine will operate differently on petrol. Most noticeably the ignition timing will need to be more advanced than should be the case for a normal internal combustion engine. As much as 20 degrees more with no pinging and will even have a reduction in power at what would be normal timing.

Another phenomena associated with this form of energy is that when the carburettor becomes fully doped with the energy the fuel might simply not want to run into the carburettor. I have had many instances where I simply can not get the fuel to run into the carburettor and there is certainly no reason why that should be the case, no blockages or obstruction to the fuel flow, it just does not flow.



# Connecting





## Connecting the cell to your engine

Dependant on the top you chose for your cell, you will either need to run an aluminium pipe or heavy aluminium cable to the engine and either method will need to connect to the engine somewhere on or near the carburettor or inlet manifold. The first step is the physical mounting of the cell. Try to locate it on the same side of the engine that you will be making your connection. Also, keep it as far as possible from anything that has magnetic fields or high voltages such as an alternator or spark plug leads. The cell should be mounted at a height that makes the output connection level with or below the point of connection on the engine.

Because the case of the cell is the anode that collects the energy it should be insulated from its mounting point even if you use the negative charging technique later described. Many plastic mounting brackets are available for 4 and 5 inch tubing and can be easily used to hold the cell. The cell should be mounted with a bracket at both top and bottom. **Do not rely on the cathode stud as a point of mounting.**

### Cathode Connection

For positive or conventional charging you should mount the cathode either by drilling a hole through the chassis or the extended frame of your generator and bolting it directly, or by using as heavy a cable as possible. A wide flat braided earth strap can be ideal and can simply be bolted to the cathode stud on one end and to the chassis or frame on the other end. If used, the cathode cable should be as short as possible, no more than 150 millimetres. Using normal low current electrical wire will result in loss of too much energy.

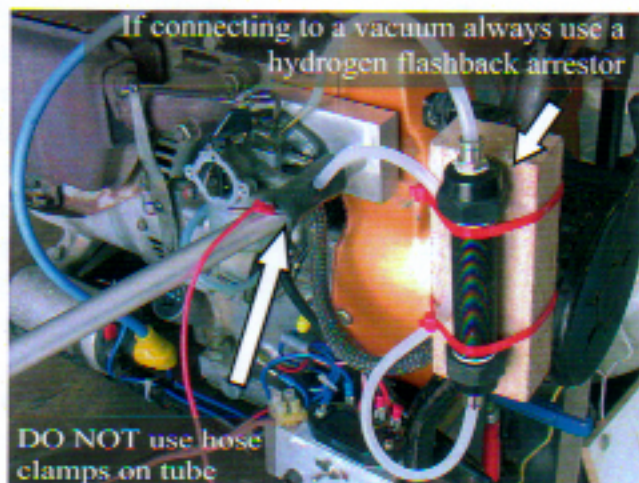
### Anode Connection

Never use hose clamps on the connecting tubes of either the first or second method. Should any pressure build up this is the point of release.

In the main section illustration you will note the cell has a clear top, this was only to enable me to visually see the effects of the vacuum on the cell. My theory does not support such a top and I have not had success in sunning the generator on it. All actual tops for an operating cell should be made from metal.

If your connection requires the tube or cable to go through a cabinet or metal sheet make sure you have at least half inch clearance right around the feed as it goes through, and insulate it with rubber. A large rubber bung may be most suitable. This would also stop heat and any fumes being blown toward the cell.

If using a tube you should stop the tube about 1 inch from your connection point. The connecting point is what is called a blind connection, that is there is no hole in it. The energy will simply enter the engine through the blind connection. I guess this is the part that has the sceptics laughing, yet they have no problem with the idea of a blind connection for electricity to flow through. Why can't this new energy enter the engine in the same way as electricity? The tube and blind connection should be connected with a piece of clear plastic tubing or rubber hose. Never use any form of



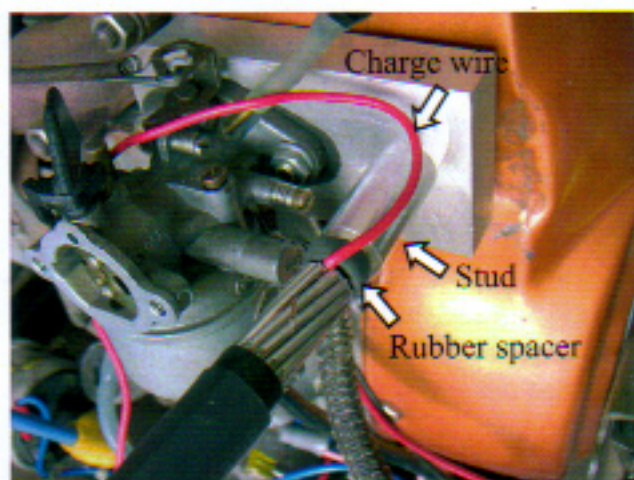


clamp at either end of the plastic tubing or hose as this is a very important safety feature. Should gases build up in the cell this is a safety release point. If you clamp this point your cell could explode and you have seen the photo of the hole in my ceiling.

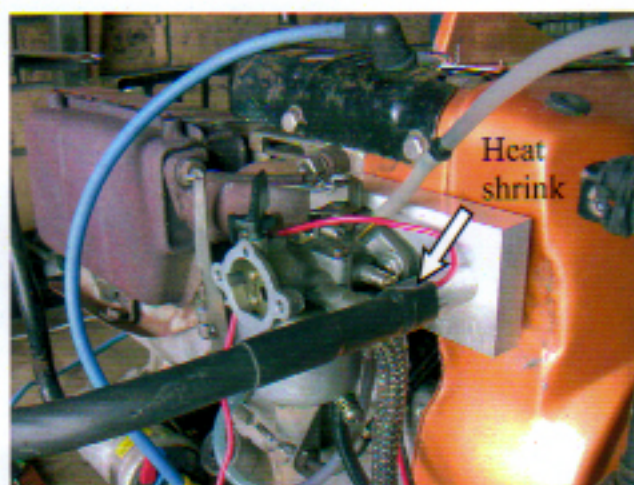
If using the aluminium cable method, it is critical that you use a solid connection on to the top of the cell. I machine a termination block out of solid aluminium and then bolt it with a 10 millimetre stainless steel bolt to the top of the cell. I then push the aluminium cable into it and secure the cable with a locking screw. Note the vent connection on top of the cell with the vent tube following the cable and connecting through a hydrogen flashback arrester to the inlet manifold.



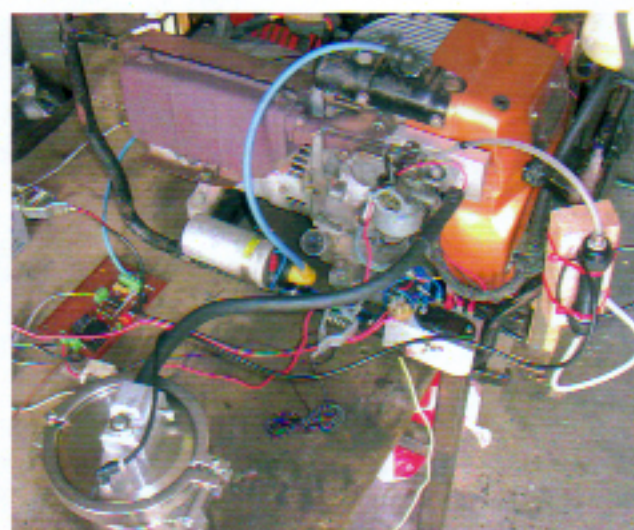
Next you need a connection to the engine. In the photo you can see that I have machined a block that is mounted between the carburettor and the engine casting and serves as a point to mount a solid aluminium stud providing an excellent blind connection point for a cable or tube. We call this a blind connection as the energy goes through it into the metal, there is no hole for gases to enter the engine.



Cut back the insulation on the cable to enable you to join the electrical charge/conditioning wire, place a length of good quality heat shrink tubing over the cable. Place a rubber spacer between the cable and the stud. I use a rubber tap washer, the hole in the washer does not pose a problem as long as strands from the cable do not go through it. Next slide the heat shrink tubing over the connection and using a heat gun, shrink it into place. Depending on the quality of the heat shrink you use, you may need to have several layers. The main thing is to have a strong physical connection so that the cable does not come off in time.



I feed a small vacuum line to the cells vent from the engines inlet manifold. This places the cell under vacuum and feeds what little gas that is produced to the engine and can assist in the transition for conventional fuel to the energy from the cell. It is of paramount importance that a suitable flashback arrester be fitted in the vacuum line. **If the engine should back fire and you do not have a flashback arrester, your cell will explode.** I only use the professional dry bead type flashback arresters. **If you do not have a certified flash back arrester, do not connect a vacuum line to the cell.** There is little doubt that the cell can work without the vacuum line, I believe in the first instance, it helps to condition the motor, many say you do not need it.





## Summary

When I first became involved in the water fuel cell. It was a device that had been around for many years. From my initial testing I had little doubt that this phenomena was real and as claimed by many a water fuel cell could run an engine and what's more the water was not consumed.

Books had been written and videos made and yet no one had developed a common language to communicate findings and achievements. I have developed formulas and terminology that I hope will permit others to better share information and results. I have presented for the first time new methods of processing and charging water for use in a cell. I show details of my many developments in both cell construction and methods of connection and offer what I believe to be a theory of operation that it based on plausible science.

What I do not want to do, is give the impression that this is now a tried and proven form of energy or a science that is well established, it is not. I simply offer my beliefs and findings hoping that people far more skilled than I explore them.

At the moment I do not believe a water fuel cell should be used in a motor vehicle. It is simply not reliable enough and poses many serious safety issues. What I do believe, is that it is an ideal development project that when proven could run a large generator or water pump. There are so many applications for these devices. Even if charities donate generators or water pumps to communities in third world countries, they can not afford the fuel to run them. Children that should be going to school walk for hours to collect drinking water for the family.

My challenge to you all is to develop this process and phenomena to the point that it can reliably run pumps and generators and we can make a difference to the lives of millions of people less fortunate than us and in doing so eventually solve the global carbon emissions problem. An engine running on a water fuel cell has zero carbon emissions.

As for myself, I will continue my research and share what I find. I have been ask why I have not applied for patents or sought buyers for my technologies or other developments. The answer is that patents stop people from freely producing and buyers would have a commercial and possibly a controlling interest. Some may even buy something like this to stop development.

Instead I chose to make what I know freely available. I am of limited means and have spent thousands of dollars furthering this project. Most of my test and developments are based on affordability. If you believe in what I am doing and are able to help by way of a donation [www.Nutech2000.com](http://www.Nutech2000.com) has placed a donate button on the web site and all donated will help to continue further developments.

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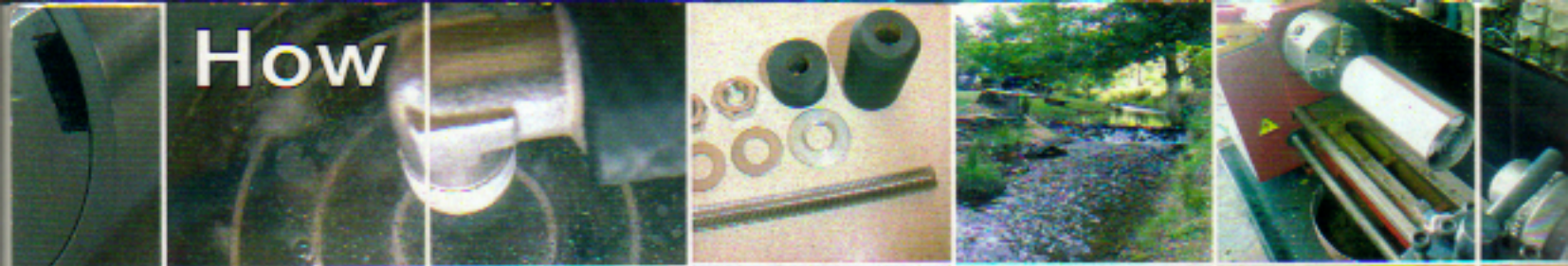
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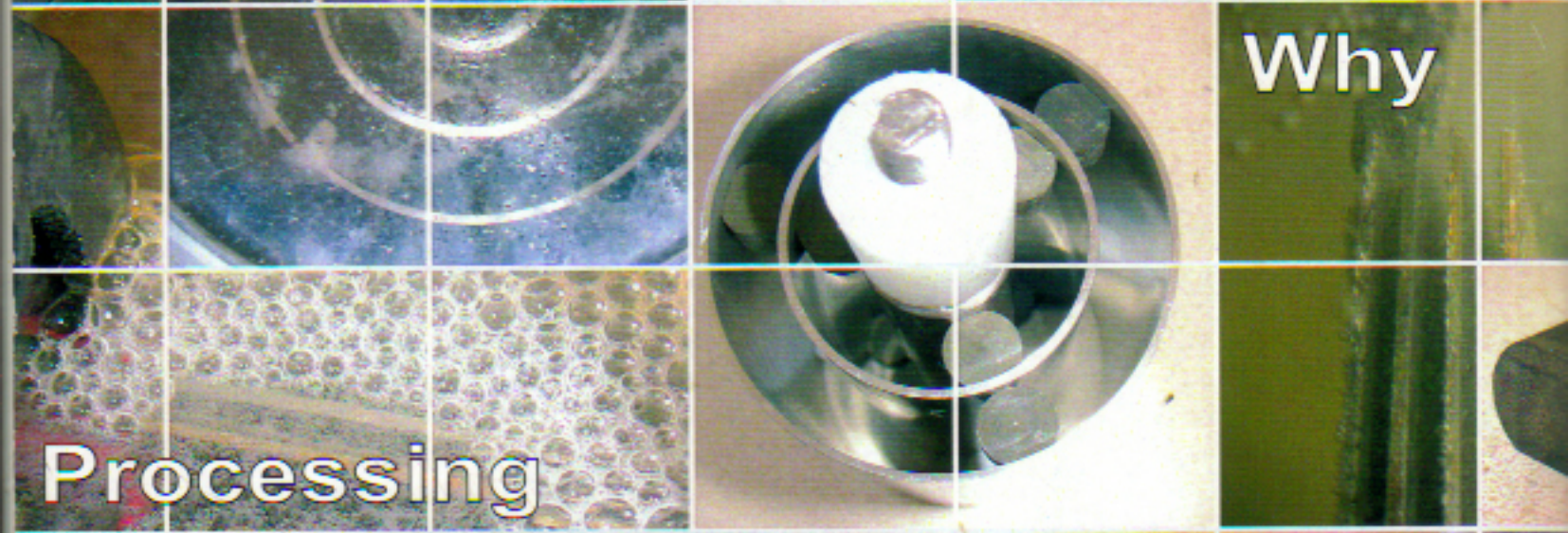




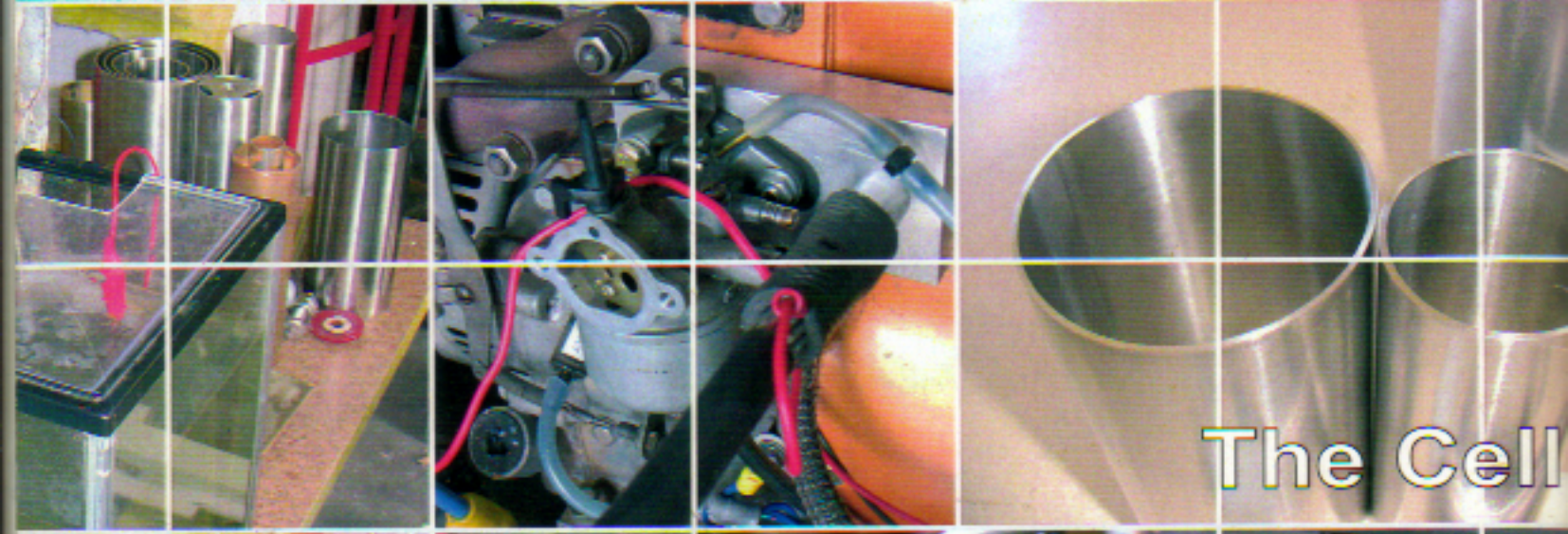
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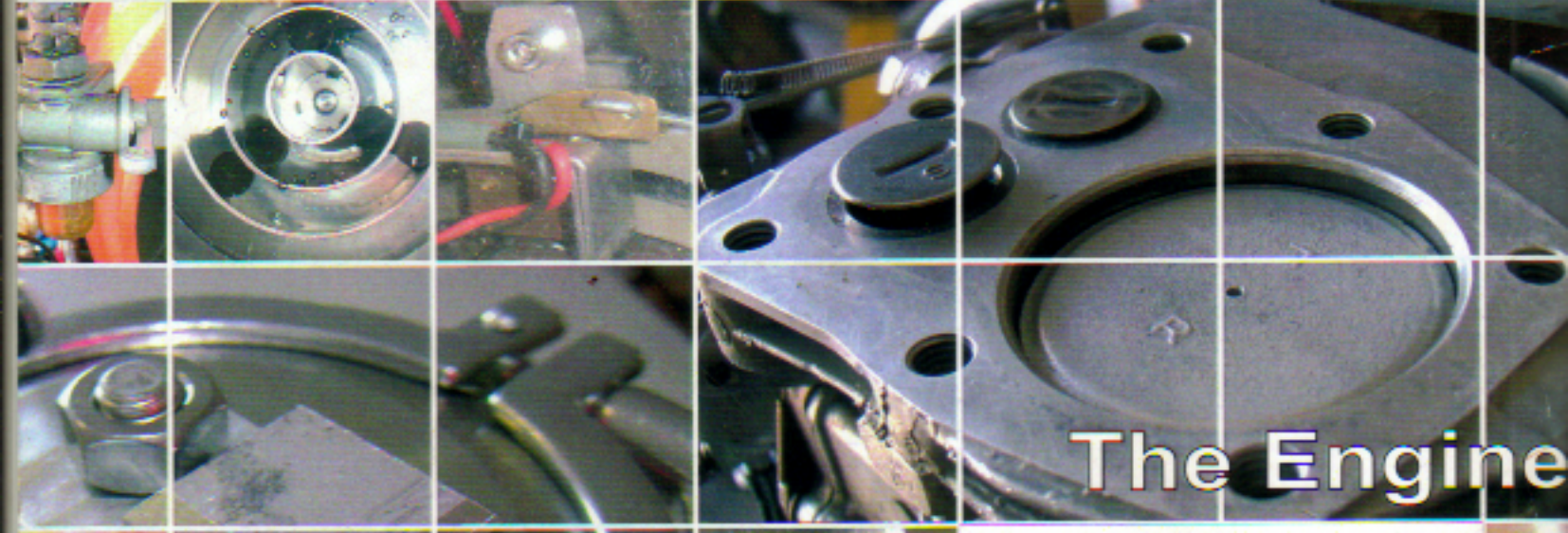
Why



Processing



The Cell



The Engine

The Latest

