

Hydrogen Gas Generator

ABE 485

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What is a Hydrogen Gas Generator?

- Uses electrolysis to break down H_2O into H_2 gas and O_2 gas.
- Electrolysis is the break down of a chemical compound by running current through it
- $2\text{H}_2\text{O} (\text{l}) \rightarrow 2\text{H}_2 (\text{g}) + \text{O}_2 (\text{g}) + 4\text{e}^-$; $E = -1.229 \text{ V}$
- Has one positive and one negative electrode.
- Each electrode is connected to a series of plates to maximize the area on which our reaction occurs.

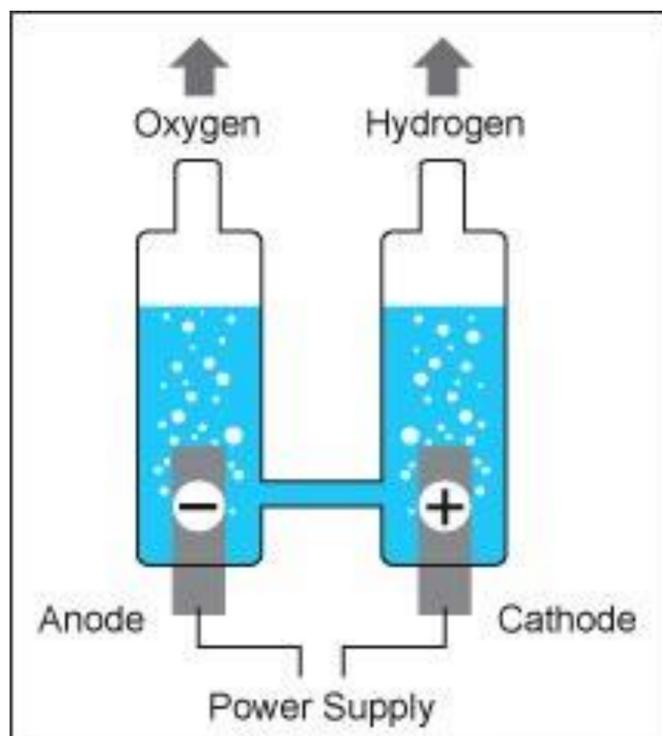


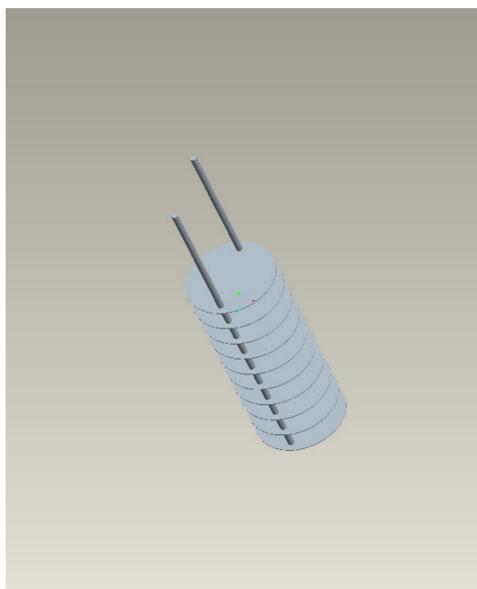
illustration by Mel@ByExample.com

Why use a Hydrogen Gas Generator?

- It is a relatively low cost device.
- It can increase the efficiency of the internal combustion engine.
- It can be implemented on already existing applications.
- It can be a “bridge” technology between current technology and the next generation technology.

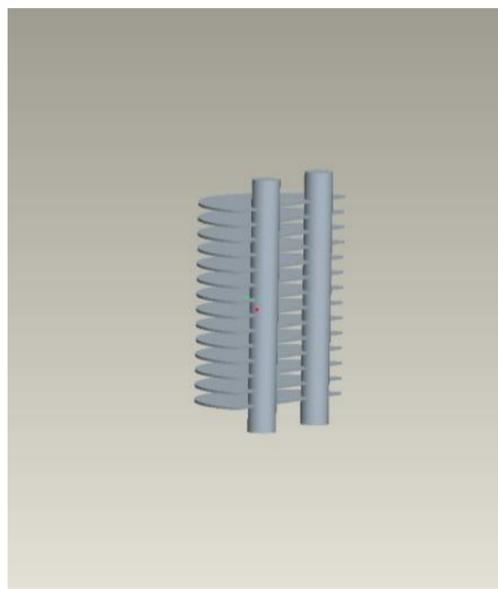
Methodology

- Do extensive research on existing Hydrogen applications as well as the safety concerns associated with Hydrogen.
- Design multiple types of plate arrangements
- Test plate arrangements and choose final plate arrangement
- Test final arrangement on an engine to determine the effects of running with a Hydrogen Gas Generator.
- Compare the output of our system to that of a known system (wind turbine).



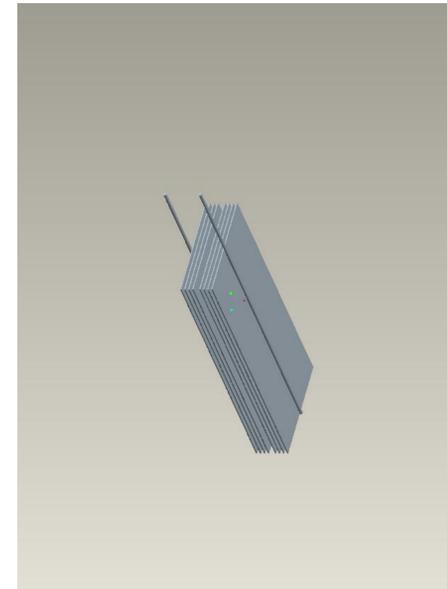
Circle Plates

- Has the most surface area of any design.
- Must be sure the positive plates do not touch the negative pole and vice versa.



Semi-Circle Plates

- Has less surface area.
- Easier to implement because each set of plates would be positive or negative.



Rectangle Plates

- Most difficult to implement because of our canister design.

Challenges in Testing

- Sealing containers
- Cost of stainless steel
- Safely harvesting the Hydrogen/Oxygen mixture

Final Design

- 4" clear PVC canister
- Stainless Steel Plates
- 1/2" bolts for the electrodes



Expected Results

- By how much will the efficiency of the engine increase?
- Will this justify the power requirement of the Hydrogen Gas Generator?
- How much will the operating temperature of the engine increase?
- Final Testing is still to be done.

Future uses:
Photovoltaic cells on a house

Hydrogen used in a
Combustible engine
Ex: Lawnmower



Solar electrical
Energy to a
battery

Electrical energy converted
Into Chemical energy via
Electrolysis