Overhauled Design for flash port of HHO Dry cell Generator

Shubham Sharma¹, Dr. Neeraj Kumar² P.G.Student¹, Head of Department² Department of Mechanical Engineering, Suresh GyanVihar University, Jaipur, Rajasthan, India Email: - <u>shubhamsharma.engr@gmail.com¹</u>, neeraj1mech@gmail.com²

Abstract: - This paper talked about Hydrogen Fuel Cell which involve a fuel tank and is stacked with demineralized water which has zero conductivity and sodium hydroxide. This power gadget is proposed to chip away at the method for Electrolysis by disconnecting hydrogen and oxygen. This framework connected the electrochemical strategy to separate hydrogen and water and rearrange to shape HHO gas, which we can moreover utilize for making cordiality and power. Thusly gives us a complete of using the resultant cordiality for various resolutions like welding, etc. Be that as it may, this paper gives a short elucidation about how to physique the proficiency of the bubbler.

Keywords- Sodium Hydroxide (NaOH), Chlorinated polyvinylchloride (CPVC), Hydrogen gas, Oxyhydrogen port (HHO), Fuel Tank, Electrolysis, Pulse Width Modulator, Six, Potassium hydroxide (KOH), bubbler, SixSigma

I. INTRODUCTION

HHO is the blend of hydrogen gas (H2) and oxygen gas (O2) together is called HHO. It is too known as oxyhydrogen. Consuming HHO makes water vapor, as it were water HHO is an exceptionally green fuel. Electrolysis is the route toward using capacity to part water into hydrogen and oxygen.

Normally we look for hydrogen gas or oxygen gas. At the point when both are risen and gathered together – we make aexplosive fuel. At that point split atoms named as H2O to HHO. Hydrogen is a risky gasses. It use exceptional alarm in testing and stick to prosperity controls in our development.

It will cause property hurt or real harm may occur. Securing hydrogen there are some other fuel which can be utilized for around a dangerous practice. Anyway HHO ought to never be secured. If began HHO can detonate inside the settled amassing compartment. Make an effort not to empower HHO to total. By setup join streak venting into HHO equip. Self-settling streak ports, flashback silencers, bubblers, and engine on control trading are focus fragments to a safe HHO support structure.

Need for the proposed work

The motivation behind the HHO bubbler is that to give highly efficient, and stronger in the term of life span, financially clever for the make of all around. The efficiency of the bubbler can't be increased without decreasing the combustion in the bubbler.

The major cause due to which combustion occurred is the flashback. Flashback is the term which means a flame moving rapidly back through a combustible vapor. In some condition the flashback occurs:

The major cause of the flashback is the chocking of the nozzle, if the nozzle is chocked on the front part, it causes to move gas backward in direction. Other cause is the starvation: Starvation is the term which describe that the actual demand of tip is not fulfilled by the gas. Which also cause flashback in the pipe. All these reason occurs in the normal welding process but in the case of HHO, the major reason of the flashback is the pressure difference. When we do some work by the HHO gas the pressure inside the pipe is around 30 to 40 bar. But if there any drop in the electricity or any discontinuation in the electricity. The pressure is dropped inside and comes around to 10 to 15 bar.

These create a pressure difference. Which cause the flame or give a reason to a flame to come inside the pipe? If the work is going on some iron material it give a reason to flame to come inside the pipe. If the flame comes inside it cause combustion because the oxygen is present inside the bubbler. And it causes to decrease the life efficiency of the bubbler. So to tackle this problem we do some enhancement work in the bubbler.

II. WORKING PROCEDURE

1. Study about the enhancement of the HHO bubbler.

Finding about types and the working of these processes.

2. Surveying various research papers of various author of IEEE, IJSR, Springer and Science direct.

3. Visiting research institute/firms for the observation.

- 4. Finding best of all the processes and the ways to optimize it.
- 5. Optimization of the best process by alteration of parameters.

6. Confirmation test performed and observation of result.

III. BASICSYSTEMCONFIGURATION

PulseWidthModulator

It is basic to control the electrolysis, in light of the way that a direct generator can be worked without (PWM) Pulse width Modulator which resemble an engine with simply the probability of full throttle. The HHO beat width modulator is fundamental for a controlled electrolysis. The specific repeat and power for the most capable electrolysis wires from generator to generator. As a result of developing of electrolyze or higher thickness the electrolysis strategy delivers more temperature, in view of the brings up in the temperature and the present course through the electrolyzed furthermore gets extended.



Fig: - 1

Fuel tank

On the most elevated purpose of the fuel tank there is a gleam port that blast port is being contained the CPVC (Chlorinated polyvinyl chloride). CPVC (Chlorinated polyvinyl chloride) is a thermoplastic which is conveyed by the chlorination of the PVC (polyvinyl chloride).

The reason for why we use the glimmer port on the most astounding purpose of the fuel tank is that since it go about as a security limit. Streak port is nothing it is a load release stopcock. The best live instance of the blast port is the yell of the cooker, which is used when the weight inside the cooker is high and it releases the extra load to the external including.

As that the blaze port is used it releases the extra weight that is made inside the fuel tank. The glimmer port is being included the PVC (Poly vinyl chloride). In the glimmer port there is a spring which is put inside the port, as the weight inside putting everything in order higher the spring glass ball while fly up and releases weight from the space gave in the blaze port to the outside including and shield the device from the impacting.



Bubbler

The bubbler is basically a compartment half stacked with water. HHO gas is urged to the base of the bubbler with a hose from your electrolyte tank and allowed to ascend through the water. The HHO gas continues through a hose from the most elevated purpose of the bubbler "filtered" to the engine. The bubbler is a cylinder formed compartment with a hose that interfaces with the generator. It empowers the hydrogen to ascend through the water in the cylinder.



Fig: - 2

The water shields a hydrogen blowback from returning into the generator, and the port will take off to release weight if there ought to be an event of an invert release.

Hydrogen generator

A HHO Generator utilizes electric stream to isolate into water into hydrogen and oxygen. The power enters the water on the left side at the "cathode" (an unfavorably charged anode). The power experiences the water and exists by methods for the "anode" (the earnestly charged cathode), showed up on the right side. Hydrogen can be assembled at the cathode, while Oxygen can be accumulated at the anode. It is in like manner possible to allow these gases to mix on out and this united gas is what we call HHO.



Fig: - 3

To play out the analysis we have taken a four perusing in four distinctive pressure condition of spring. That is in how much weight a spring will pack in 100% pressure, 75% pressure, and half pressure and in 25% pressure.







Fig: - 6

Initial step is to figure the volume of ignition chamber:- $V_{Ignition} =$ Total volume of ignition chamber = $\pi \times r2 \times h$ $= \pi \times 32 \times 32 \times 50$ $= 160849.54mm^3.....$ (I)

To figure the number of balls will fill in the glass. We took again the assistance of water. In further advance we filled water in the glass to a tallness of 22mm. what's more, determined the how much region the water has secured.

V water = Volume of water= $\pi \times r2 \times h$ = $\pi \times 32 \times 32 \times 22$ = 70773.7mm³... ... (ii)

We utilized both the above condition. What's more, to decide how much volume the glass ball has involved. We subtract the two conditions.

Volume involved by glass ball (V3) =Total volume of ignition chamber – Volume of water =160849.54 – 70773.7mm =90076mm³

The above outcome demonstrate that the how much volume is secured by the glass ball. So to figure what number of ball is in the glass we have utilized straightforward arithmetic condition.

Number of glass balls ×Volume of each glass ball = Volume possessed by the glass balls

To compute the volume of each glass ball= $4/3 \times \pi \times (15)^3/8$ = 1766.66mm

> In this way, the quantity of glass ball present in the compartment are: V3/Volumeofeach $93423.53/4/3 \times \pi \times (14.8)^3/8$ $= 51.00 \cong 51$ (*GlassBall*)

Enhanced Bubbler Six Sigma Calculation

= 1hour = 3600 sec = 12 hour = 43,200 sec = 1 beat is produced in 4 sec. = 44,200 /4 = 11,050*Pulses*

Along these lines, 80 beats demonstrated to us the deformity Number of opportunities= 11,050 heartbeats Number of Defect = 80 beat Along these lines, (Number of opportunities- Number of deformities)/ Number of chances = (11,050 - 80)/ 11,050= $0.992760 \approx 0.9927$ = 0.9927×100 = $99.27 \% = 4.06\sigma$

Older Bubbler Six Sigma Calculation

Number of opportunities= 14,000 heartbeats Number of Defect = 800 to 900 heartbeats

Thus, (Number of opportunities- Number of imperfections)/ Number of chances

= (14,000 - 900)/ 14,000= $0.9357 \approx 0.935$ = 0.935×100 = $93.5\% = 3.0\sigma$ It plainly observes that the

It plainly observes that there is ascent of 1.06 sigma level in the improved bubbler. The improved bubbler is more effective than the past bubbler



IV. CONCLUSION

From the above talk it can express that the improved bubbler is reflected as the best for the better adequacy. This is by virtue of the overhauled bubbler performs better in all of the parts of connection i.e. Quality, Reduction, temperature in the start an area, Use of the glass ball, high bore of spring. The updated bubbler ends up being exceedingly practical for the Flashback fire in attractive conditions. Updated bubbler gives a smart and correct errand. Enhanced bubbler should be considered for the headway of the including, less impact zone change in the capability of the bubbler.