



FABRICATION & ANALYSIS OF AN AQUA SILENCER

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ABSTRACT

Air pollution plays vital role for the human health. It can be defined as addition to our atmosphere of any material which will have a hazardous effect on life upon our planet. The pollutants which **will** be contributed by automobile are oxides of nitrogen(NO_x), Unburned hydrocarbon(UBHC), Carbon mono-oxides(CO) & Lead & It contributes heavily to contaminants of our environment so it is necessary that serious attempts should be made to conserve the environment from degradation. Hence, AQUA SILENCER is an attempt in this direction. An AQUA SILENCER is mainly dealing with control of emission & noise in automobile exhaust system. By using the perforated tube, Activated charcoal layer, Outer shell, Non return valve, Flange, H-Nipple it is constructed. AQUA SILENCER is fitted at the exhaust of the engine. The activated charcoal filters the harmful gases produced from the engine such as sulphur. sound produced under water is less hearble than sound produced in the atmosphere .It is mainly due to small sprockets in water molecules which lower the amplitude Thus ,Lowers the sound level. It is tested in single cylinder 4-stroke disel engine the smoke level & Noise is considerably less than conventional silencer.

Keywords: Aqua silencer, Perforated tube, NO_x , UBHC, CO, Outer shell ,noise

I. INTRODUCTION

The reason behind replacing the conventional silencer with Aqua silencer is it gives the effective results than it & also it's light weight & slender design. It controlles the noise & emission in an ic engine. It offers the low noise & Reduced backpressure at the exhaust system.The main reason why we should preferred aqua silencer is, in our day to day life air pollution causes physical ill effects to human beings & also the atmosphere & the main contribution of air pollution is automobile which releases the harmful gases like CO,UBHC, NO_x etc

In order, We avoid this type of gases by introducing the aqua silencer. It is fitted at the exhaust of the pipe; sound produced under water is less hearble than sound produced in the atmosphere .It is mainly due to small sprockets in water molecules which lower the amplitude Thus ,Lowers the sound level. The emission of gases can be controlled by using the activated charcoal layer & lime water. Activated charcoal layer is highly porous & posse's extra free valences so it has high absorption capacity along with this lime water chemically reacts with the exhaust gases from the engine & release much less pollution to environment. The noise & smoke level is considerably less than the conventional silencer, no need of catalytic converter & easy to install

In this silencer, The water & charcoal is used so it is called as hybrid Aqua silencer & it is useful in marine & Boats ,Automobile etc...



II.COMPONENTS AND EXPALANATION

2.1 Components

1. Perforated Tube.
2. Charcoal Layer.
3. Outer Shell.
4. Non Return Valve.
5. Flange.
6. H-Nipple.

2.2 Explanation

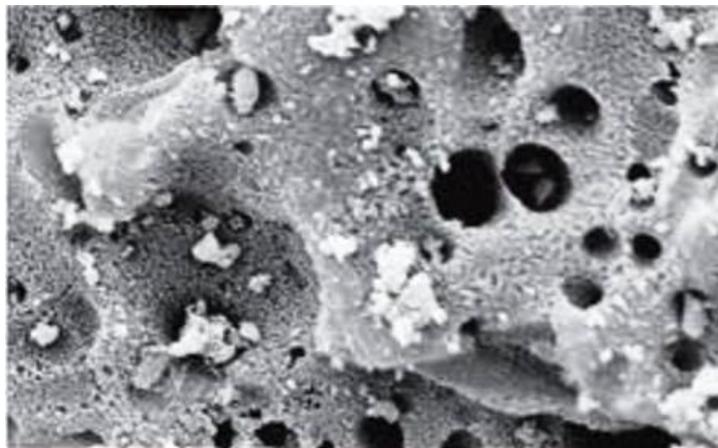
1 PERORATED TUBE

The perforated tube consists of number of holes of different diameters. It is used to convert high mass bubbles to low mass bubbles. The charcoal layer is pasted over the perforated tube. Generally 4 sets of holes are drilled on perforated tube. Other end of the tube is closed by plug



2. CHARCOAL LAYER

The charcoal layer has more absorbing capacity because it has more surface area. This charcoal is called as ACTIVATED CHARCOAL. It is produced by heating the charcoal above 1500 °c for several hours in a burner. Its surface area gets increased





3. Outer Shell:

The whole setup was kept inside the outer shell. It is made up of iron or steel. The water inlet, outlet and exhaust tube was provided in the shell itself.



4. NON RETURN VALVE:

The non return valve is a mechanical device a valve, which normally allows fluid (liquid or gas) to flow through it in only one direction. The Aqua silencer was filled with water and it is directly connected to the exhaust pipe of the engine. There is a chance for the water to get enter into the engine cylinder. To avoid this, Non return valve is used. It allows the flow of fluid in one direction only



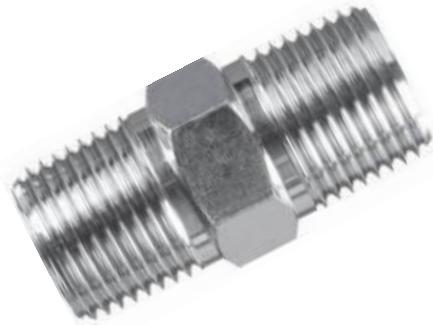
5. FLANGE

A flange joint is a connection of pipes, where the connecting pieces have flanges by which the parts are bolted together. Here flange is used to connect the silencer to the engine.



6. H- NIPPLE:

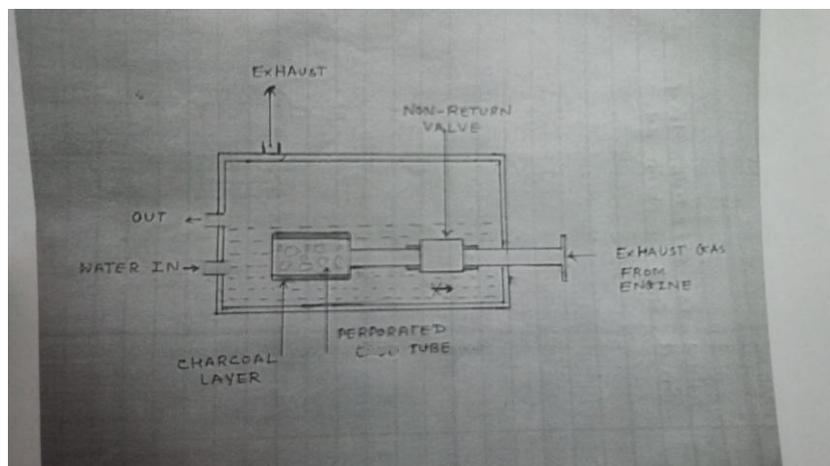
It is a device which is used to connect two pipes together. It consists of two threaded sides.



III. CONSTRUCTION

Basically an aqua silencer consists of a perforated tube which is installed at the end of the exhaust pipe. The perforated tube may have holes of different diameters. The very purpose of providing different diameter hole is to break up gas mass to form smaller gas bubbles the perforated tube of different diameter. Generally 4 sets of holes are drilled on the perforated tube. The other end of the perforated tube is closed by plug.

Around the circumference of the perforated tube a layer of activated charcoal is provided and further a metallic mesh covers it. The whole unit is then placed in a water container. A small opening is provided at the Top of the container to remove the exhaust gases and a drain plug is provided at the bottom of the container for periodically cleaning of the container. Also a filler plug is mounted at the top of the container. At the inlet of the exhaust pipe a non-return valve is provided which prevents the back flow of gases and water as well[2].



Line diagram of aqua silencer

IV. WORKING PRINCIPLE

- As the exhaust gases enter into the Aqua silencer, the perforated tube converts high mass bubbles in to low mass bubbles after that they pass through charcoal layer which again purify the gases.
- It is highly porous and possesses extra free valences so it has high absorption capacity.
- After passing over the charcoal layer some of the gases may dissolve into the water and finally the Exhaust gases escape through the opening into the atmosphere.



☐ Hence aqua silencer reduces noise and pollution.

MERITS:

- No vibration when the engine is running.
- Start the engine easy.
- SOUND IS REDUCED
- LOW COST
- Control emission and noise in greater level.
- Carbon is precipitated.
- CO IS REDUCED 60 TO 70% COMPARED TO ORDINARY SILENCER

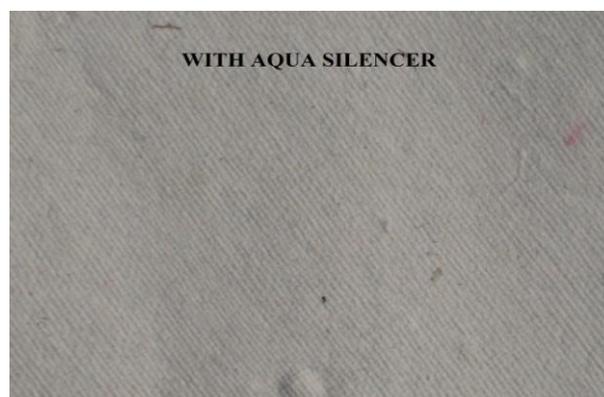
DEMERITS

- Frequent water filling is required.
- Silencer weight is more comparing to conventional silencer.
- MORE SPACED IS REQUIRED
- AQUA SILENCER IS BIG IN SIZE
- Cost of activated charcoal is more.

RESULT ANALYSIS ON EMISSION



AQUA SILENCER



V. CONCLUSION

- The aqua silencer is more effective in the reduction of emission gases from the engine exhaust using perforated tube and charcoal, by using perforated tube the backpressure will remain constant and the sound level is reduced.
- This aqua silencer performance is almost equivalent to the conventional silencer. It can be also used both for two wheelers and four wheelers and also can be used in industries.
- It is smokeless and pollution free emission and also it is very Cheap.
- By using water as a medium the sound can be lowered and also by using activated charcoal in water we can control the exhaust emission to a greater level.
- By using perforated tube the fuel consumption remains same as conventional system.

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