

## Aqua silencer

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**ABSTRACT-** Global warming is increasing on our earth due to major increase in the pollution. Air pollution is very serious problem on our earth. The main component due to which the air pollution is increasing are (Co), (Nox) and lead which is get exposed from vehicles. The other sources such as big factories, electric power, generation plants, big industries etc .So it is required to solve these problems by taking various serious attempts. Aqua silencer is one of the attempt taken in reduce the air pollution. It is fitted to the exhaust pipe of engine or system. These Silences is used to reduce the noise and control the emission of dangerous gases. In aqua silencer the main component perforated tube which consists of number of different diameter holes. Generally these are 4 set of holes on perforated tube. Charcoal layer is pasted over that tube and it is used to convert high mass bubbles to low mass bubbles. The aqua silencer reduces emission noise because, the sound produced in aqua silencer under water having less amplitude than the sound produced in open atmosphere .These is happen because of in water molecules there are small sprockets which lowers amplitude of emission gases and lower the sound level. The charcoal layer which is pasted over perforated tube can control the emission using the activated charcoal and highly porous extra free valences so these layer having high absorption capacity.

### 1.INTRODUCTION

The reason behind replacing the conventional silencer with Aqua silencer is it gives the effective results than it & also its light weight & slender design. It controlles the noise & emission in an icengine. 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 ,NOX 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 hearable 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...

### 2.COMPONENTS AND EXPALANATION

- Perforated Tube.
- Charcoal Layer.
- Outer Shell.
- Non Return Valve.
- Flange.
- H-Nipple.

#### 2.1 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 .

#### 2.2 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 foe several hours in a burner.Its surface area gets increased.

### 2.3 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.

### 2.4 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

### 2.5. 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

### 2.6 H- NIPPLE:

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

### 3.CONSTRUCTION

The main component of aqua silencer is perforated tube. It fitted at end of exhaust pipe of engine. This perforated tube consists of different diameter holes to convert increase in mass bubbles to decreasing mass bubbles on perforated tube. Generally 4 sets of holes are drilled. The plug is provide to close the other end of perforated tube. The activated charcoal layer and metallic mesh covers is provided around circumference of perforated tube. The perforated tube contains the lime water inside it which chemically reacts with exhaust gas from the engine.

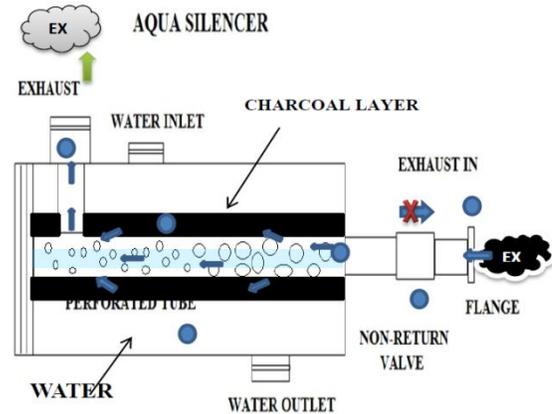


Fig: 3.1 "Aqua silencer"

These whole unit or system is then placed in the container which is filled with water to remove exhaust gas. The small opening is provided at the top of water container and at the bottom of the container opening is provide for cleaning purpose. At the top of container fulfiller plug is also provided. A non return valve is provided at the inlet of exhaust pipe to avoid back flow of gases and water as well. If exhaust gas enter to aqua silencer, perforated tube convert the high mass of bubbles to the low mass.

### 4.WORKING PRINCIPLE

The exhaust gas from the engine cylinder is enters in to the twin filter silencer through perforated tube. Through the perforated tube gas first enters in to the primary filter of the silencer. Perforated tube is a special tube having different diameter sections. So the perforated tube converts high mass bubbles in to low mass bubbles. At the primary filter lime water reacts with toxic gases & reduces its concentration. After that they pass to the secondary filter consist of charcoal which again purify the gases. A charcoal is highly porous and possesses extra free valances. So it has high adsorption capacity. Finally the exhaust gases escape through the opening in to the atmosphere. The twin filter silencer is more effective in the reduction of emission gases from the engine exhaust gas using water and lime stone mixture. By using water and lime stone mixture the back pressure will remain constant and the sound level is reduced. By using water as a medium the sound can be lowered and also by using limestone in water we can control the exhaust emission to a greater level. The water

contamination is found to be negligible in twin filter silencer, because the amount of acidity level in twin filter silencer is expected to be below the dangerous acidity. It is smokeless and pollution free emission and also very cheap. Hence twin filter silencer reduces both noise and pollution. The twin filter silencer's performance is almost equivalent to the conventional silencer

### 5. ADVANTAGES

- 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.
- Cost is reduced 60 to 70% compared to ordinary silencer

### 6. DISADVANTAGES

- Frequent water filling is required.
- Silencer weight is more comparing to conventional silencer.
- More spaced is required
- Aqua silencer is big in size

### 7. APPLICATION

- It is used in marine & boats
- It is applicable for DG sets & DG machine
- It is used in industrial sector
- It is also used in automobile sector

### 8. CONCLUSION

An Aqua Silencer having more efficiency to reduce emission gases from engine using lime water, charcoal layer and perforated tube with the use of perforated tube back pressure always remains constant and sound level of exhaust reduces. Contamination of water remain very very less in aqua silencer. In this system fuel consumption remain same as conventional silencers because the use of perforated tube. Due to use of water as a medium sound reduces these system having pollution free emission and smokeless. These system is very cheap. These system is used for both four wheelers and two wheelers. It plays important role in industries

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