



Short Review Paper

Aqua silencer

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Abstract

Air pollution is very serious problem for the public health of view, because every person breaths approximately 22,000 times a day, inhaling 15 to 22 kg of air daily. Air pollution effect on living things. The main component due to which air pollution is increasing are carbon-dioxide, which is get exposed from vehicles and other harmful gases which is comes out from the big factories, electric power, generation plants, big industries etc. So it is important to solve these problems by taking serious steps. Aqua silencer is the one of the step taken in reduce the air pollution. It is fitted to exhaust pipe of engine. These silencer are used to reduce the noise and control the emission of harmful gases. 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. This is happen because of in water molecules there are small sprockets which lowers amplitude of emission gases and lower the level of sound. The layer of charcoal which is pasted over perforated tube can control the emission by using the activated charcoal and highly porous extra free valences because these layer having high absorption capacity.

Keywords: Aqua Silencer, Air pollution, vehicles,

Introduction

Aqua silencer play an important role in control the noise and emission of harmful gases from engines. The main reason behind the use of aqua silencer is because now a day's air pollution is increasing rapidly¹.

Diesel engines play an important role in road and sea transport, agriculture, mining and other industries. We cannot ignore the harmful effects of the large mass of the burnt gases, which effect the purity of our environment every day.

The emission of gases controlled by the activated charcoal layer around perforated tube and lime water. The charcoal layer having high capacity to absorb emission gases from engine. These type of charcoal layer with lime water reacts chemically with emission gases and change the structure of the gases. The smoke/gases and noise level in aqua silencer is very low than the commonly used silencer.

Construction

The main component of aqua silencer is perforated tube. It is fitted at end of exhaust pipe of engine¹. This perforated tube consists of different diameter holes to convert the increase in mass bubbles to decreasing mass bubbles on perforated tube.

The activated charcoal layer covers is provided around circumference of perforated tube. The perforated tube contains lime water inside it which is chemically reacts with exhaust gas from the engine.

These whole systems are then placed in the container which is fitted with water to remove exhaust/harmful gases. The small opening is provide at the top of the water container and at the bottom of the container opening is provide for cleaning purpose a non return valve is also provide at inlet of exhaust pipe to avoid the back flow of the both gases and water as well. If exhaust gas enter to aqua silencer, perforated tube convert it into the high mass of bubbles to the low mass². Parts of aqua silencer: i. Perforated tube, ii. Non-Return Valve, iii. Outer Shell, iv. Flange, v. Charcoal Layer.

Perforated tube: It consist number of hole of various diameter mainly there are four sets of holes. It is used to convert the high mass of bubble to low mass and very important activated charcoal layer is pasted are it.

Non-Return Valve: It is an important part uses to avoid back flow of water and gases.

Outer Shell: In outer shell whole system is kept inside it. It is mainly made up of steel or iron. Water outlet, inlet also the exhaust tube was providing in there shell itself.

Flange: A flange is the connection of pipe where the connecting pieces have flanges by which the parts are bolted together flange is essential part it connect silencer to engine.

Charcoal Layer: Charcoal layer having high absorption capacity because it having large surface area. These type of charcoal called activated charcoal. These activated charcoal is produced by heating it up to 1500 degree centigrade for specified hours in a burner⁶. Thus it is surface get increasing.

Working: The exhaust gases from engine enters from inlet to aqua silencer then perforated tube convert the high mass of bubble to the low mass of bubbles⁷. Then these gases passes through charcoal layer which again purify the gases. During that gases get contact with lime water they chemically react with it.

The charcoal layer is covered with outer shell which is filled with water die to that emission noise is reduces. The sound produced in water is less than the sound produced in the atmosphere⁸. Finally exhaust gases escape through the opening at the top of container into the atmosphere hence from above working principle aqua silencer reduces air pollution and noise.

Effects of dissolved gases in water

In this system, water is absorbing medium. In aqua silencer gases made to dissolve in water, when this gases from engine get dissolve in water they form acid, carbonates and bi-carbonates⁹.

The dissolve carbon-dioxide forms bi-carbonate having less pH and carbonates at greater level of pH. This level is upto 40 to 400 mg/liter. The carbon dioxide mixed with the water to form carbonic acid. It causes green-house effect. The nitrogen under water goes into oxidation to form ammonia.

Methods to control water pollution: i. The water is treated with the calculated quantity of slaked lime. After mixing the heavy precipitate get settle down as sludge at the bottom of the tank and remove from time to time. ii. Lime can be easily neutralize any acid present in the water. iii. Activated charcoal available in the form of powder. As it is highly possess free valences and highly porous. Hence it possesses high absorption capacity¹⁰.

Merits: i. Less vibration during running time. ii. Easily engine gets start. iii. Emission and noise controlled at greater level.

Demerits: i. Once in year there is requirement of filling of lime water. ii. More requirement of space. iii. The weight of silencer get increase.

Conclusion

An aqua silencer having more efficiency to reduce emission gases from engine. The emission gases controlled by lime water, charcoal layer and perforated tube. The perforated tube back pressure always remains constant and sound level of exhaust reduces. These system having pollution free emission and

smokeless. These system is very cheap. These system easily use in four wheelers and two wheelers.

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