

Window Filter (WinTer) To Capture Pollution of Lead (Pb) For Houses Near The Highway To Prevent Health Problems

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Abstract— Lead (Pb) is a chemical element that stable and used in various fields of modern industry, such as an ingredient in paint, batteries, a mixture of gasoline and many more. Lead (Pb) is a material which is very dangerous because it has toxic properties, when entered into the human body will cause some health problems, for example, disorders of the kidneys, brain, and other dangerous disorders. Window filter is a solution to overcome the anxiety experienced by any people. Window filter is a complementary window of the house that has the ability to filter smoke exposure of lead (Pb), so that the community house near the highway to minimize the potential for developing the disease due to lead (Pb). The workings of this product is to filter the smoke of lead even though the window was open so that residents feel comfortable due to the air vents keep it running smoothly. In addition, residents will be prevented from diseases caused by lead (Pb).

Keywords: Window Filter

INTRODUCTION

Technological developments and the industry flourished with rapid and giving out many benefits for human. As a result of the development of the air pollution was increasingly increases. Technological developments and the industry has the potential to lead to the damage to the environment where human life. Some of the impact due to technological developments and the industry is smoke from a factory chimney, fumes and other. The smoke generated contain substance that can cause health and detrimental to the surrounding environment. In the air pollution standards (ISPU) it is stated that the category of the good is the air that have air quality that didn't give the impact of bad for the health of man, and don't give a bad influence for plants and aesthetic values building. The air that was not healthy is when the air in an area can lead to the health of the public distracted.

Gas pollution containing carbon, nitrogen, sulphur, lead, and the ozone can cause problems breathing, cancer, lower level of intelligence, and cause of death. Air pollution due to the transportation made

fuel gas (spark ignition engine) produce 70% carbon monoxide (CO), 100% lead (Pb), 60% hydrocarbon (HC), and 60% nitrogen oxides (NO_x). Diesel transport (compression ignition engine) product particles smooth will settle longer in lungs and make a factor in the trigger cancer. Currently, Catalytic Converter which has the function of converting harmful pollutants into harmless gases are still being developed. It is installed in the exhaust system which is owned by transportation. So, the exit gas must flow through its dumpsites. However, Catalytic Converter can not reduce the content of lead (Pb) in the remainder of the fuel. So, it is only used on vehicles that are not used to fuel that contains lead. The houses on the highway has the potential for exposure to lead pollution (Pb) on disposal of transportation fuels. Vehicles passing through a highway not all of the vehicles have filters on the disposal, and not all vehicles put on fuels that do not contain lead. So, the people whose lives beside the highway can not guarantee the cleanliness of the air they breathe everyday. Therefore, technology is required to filter out lead (Pb) that will go into the house.

METHODS

Making Windows Filter (WinTer) is done in two ways. The first way is to make activated carbon with a cane raw material in the form of dried brown fibers. The methodology used has been developed by researchers some time ago. The first step is carbonized raw material with a temperature of 300°C - 400°C with a time of 2 hours in the furnace airtight so that the material transformed into black charcoal. The second step is the refining, charcoal pulverized to sizes small so that the activator process to get optimal results. The third step is the activation using a reactor at a temperature of 900°C by using carbon dioxide and the activation time is 60-120 minutes. Activated carbon formed then washed using

HCL. After the manufacture of activated carbon, the second way is the creation of windows. The windows are made with wood on all four sides. The middle room on the window to give the wood that has been coated by activated carbon, this part is a part that has a function to bind lead in the air due to the disposal of transportation fuel that contains lead.

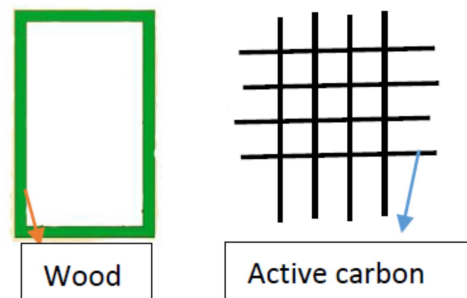


Fig 1. Part of Windows Filter (WinTer)

Testing to effectiveness from the performance of the using lead matter that was put in one container filled with tears. The container put in the house close to the window. Lead matter will read lead levels are there in the container and be reference to the level of the window filter this effectiveness.

RESULTS AND DISCUSSION

Carbon active is one of the form of carbon amorf, the largely consist of carbon free as well as having internal surface so that have the ability of the spare that good. The spare for carbon active generally depending on the number of union carbon which ranged between 85% to 95% carbon free. Basically carbon active can be made of all the ingredients that contains carbon, good derivd from the plants, the animals or goods mine. The material is various types of wood, the oat chaff, bon animals, a coal, the shell coconut, leather coffee beans and others. The principle of carbon active is carbonitiation that the process of the establishment of the shell palm oil into carbon, then in aktivasi use chemicals. The process of aktivasi chemistry refer to these chemicals or activating reagents. Follow Kirk and Othmer (1940), chemicals that can be used as a activating of them CaCl₂, Ca(OH)₂, NaCl, MgCl₂, HNO₃, HCl, Ca₃(PO₄)₂, H₃PO₄, ZnCl₂, and so on. Aktivasi chemistry made by mixing carbon material with activating reagents, furthermore a mixture of dry and heated. Worth of carbon active one is as purification gas or eliminate toxic gases.

Analysis done with observation in the windows without carbon active and the window with carbon active. A container who put behind the window into reference important to know the content of lead in the air of the ordinary.

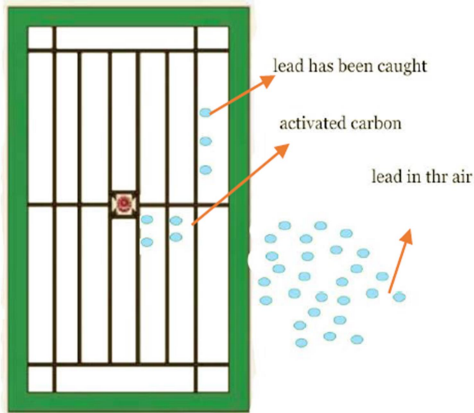


Fig 2. Sistem of Windows Filter (WinTer) Working

Working system of Windows Filter (WinTer) is a window that is installed in the house, then the window is made of activated carbon will absorb and filter the lead content in the air. Lead existing gas in the air will stick to the activated carbon of the winter so that air can get into the house is the air is clean. This system is very useful because it can reduce the risk of health problems due to infection by gas lead.

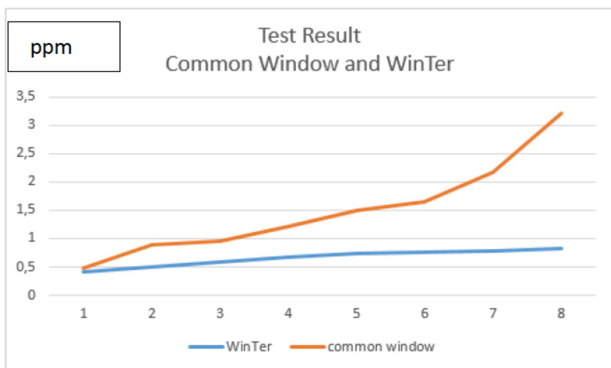


Fig 3. Test Result Between WinTer and Common Window

Fig. 3 showed that the windows have the ability to filter to absorb lead levels are there in the air. The decline in the value of lead pollution occurred as a result of activated carbon capture some of lead in the air before entering the house and read by lead meter. The above data shows that the window filter may be one of the solutions of elevated levels of lead in the air, thereby reducing the risk of disease due to lead society.

CONCLUSION

Lead pollution is dangerous because it can damage the health of people who breathe it. Various methods are used to the effects of lead can be reduced and even eliminated. Window Filter (WinTer) is one solution in addressing air pollution from lead. Windows Filter (WinTer) will capture the gases of lead contained in the air before the air inside the house so that the incoming air can avoid the dangers of lead pollution threat. Window Filters (WinTer) can be developed with more advanced technology so as to provide a more beautiful design, and was developed with active carbon nicer so that the efficiency of the performance of these tools can be maximized so that people do not worry about the dangers of lead pollution.

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