

# Study of control the pollution by Road side purifiers by water storage and through raw material concept

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**Abstract:-**Now days we used the motor vehicle to travel one place to another place which is necessary to all for to make the journey smooth and comfortable and we used daily consumption lots of fuel which cause of main reason of pollution so can use the construct of purifier(**Hepa filter and Electrostatic Precipitators made of borosilicate glass fibers or plastic or fiber** ) with air filter on road side which sucked the whole gases and dust particle through fan mounted on the top of filter where the some specific raw material converts the gases and dust particle collect into bottom of the tank mounted bottom of filter which direct connect to main pipe of fan mounted on top, water tank dissolved all dust particle into water and another water purifier bond to water tank purifies remain water here can use waste water reuse by filtration process for harvesting and drinking purpose.

**Keywords:-HEPA filter, electrostatic precipitators, settling water tank, Activated carbon**

**INTRODUCTION:-**Air purifiers evolved in response to people's reaction to allergens like pollen, animal dander, dust, and mold spores. Reactions like sneezing, runny nose and more severe consequences such as asthma attacks are the result of antigens found in the home. These antigens are major triggers of asthma, and there are more than 18 million asthmatics in the united states alone. Air purifiers remove a portion of these particles, thus reducing allergic type responses.

Due to their extremely small size, allergens are able to pass through a standard vacuum cleaner bag and redistribute into the air where they stay for days. Even a single microgram of cat allergens is enough to invoke an allergic response in most of the six to 10 million Americans who are allergic to cats. Other airborne particles such as bacteria and viruses can cause illness and some of which are fatal. There are many reasons allergies, asthma, fatal. There are many reasons allergies, asthma, fatal, illnesses that millions of air purifiers are sold in the united states every year.

There are two types of air purifiers that can remove some or all of the disease and allergy causing particles in the air and the most effective are classified as high efficiency particulate air filter HEPA filter and electrostatic precipitators.

## **Raw material:-**

HEPA filters are made out of very fine glass threads with a diameter of less than 1 micron (micron is 0.00004 in 0.001mm). By comparison, a human hair has a diameter of about 75 microns (0.003 in 0.07mm). The fine glass threads are tangled together and compressed to form a filter mat. Because the individual threads are so microscopic, most of the mat consist of air. The openings in the mat are very small, generally less than 0.5 micron (0.00002 in, 0.0005mm). HEPA filter will collect particles down to 0.3 microns(0.00001in, 0.0003mm) in diameter.

Electrostatic precipitator rely on electrostatic forces to remove particles from the air. They work by creating a cloud of free electron through which dust particles forced to pass. Electrostatic precipitators can collect particles down to a diameter of 0.01 microns (0.00001mm). A water tank planted bottom surface of the earth

to collect the dust particles into water tank bed whose pipe line directed connect to the main pipe line of the fan where dust particles come into the channel by suction of fan and settle down on the water tank ,two filters are use in the water tank to reuse the waste water for harvesting and drinking purpose.

HEPA filter nor electrostatic precipitators can remove volatile organic compound from the air, therefore do nothing to reduce odors. for this reason most of air purifiers are equipped with a pre or post filter composed of activated carbon. Activated carbon produced by heating a carbon sources like old tires and by bones etc at very high temperature in the absence of oxygen. The pure carbon from the other materials contained in the raw material. The pure carbon is then exposed to steam at 800 c. The high temperature steam activates the carbon. The activation process provides the carbon with an enormous surface area per weight about 6.5 acres/oz. The millions of cracks provide locations where organic compounds can be adsorbed. In addition the surface of the carbon carries a residual electric charge that attracts non polar chemicals.

#### **Electrostatic precipitators:-**

- 1. The electrostatics precipitators collection system in manufactured by enclosing steel plates into a plastic casing. often by hand assembly. The plates are arranged parallel to each other in the case.**
- 2. Wires are then connected to alternate plates through which the high voltage positive direct currents will be applied to the plates.**
- 3. A voltage transformer which is used to convert 115 volt household alternating current into high voltage direct current is fixed to the precipitators case. This voltage is run to both the positively charged collector plates and the ionizing wires.**

#### **Carbon filter:-**

- 1. The activated carbon filter usually consists of carbon impregnated cloth or fan. This is manufactured by infusing the raw material with powdered activated carbon.**
- 2. The carbon filter is then wrapped around the inside of the HEPA filter or stretched in a frame at either the inlet or outlet of the electrostatic precipitators.**

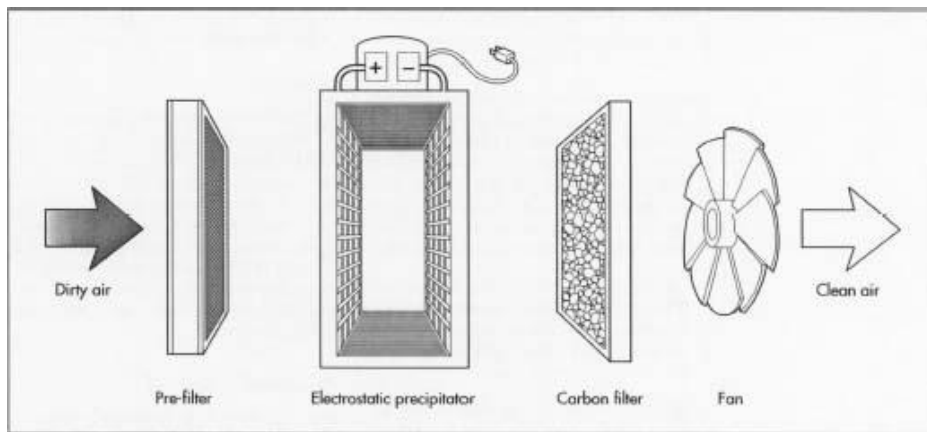
#### **Settling water tank:-**

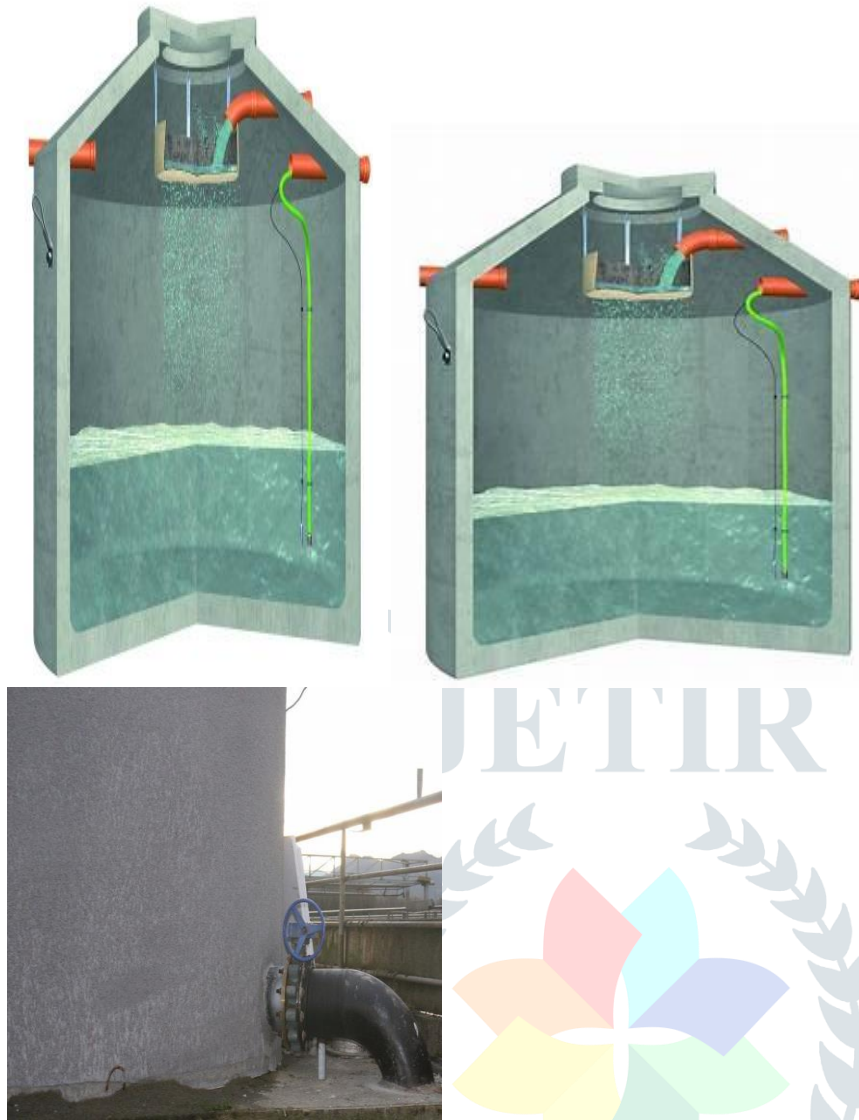
- 1. The dust particle settle down to the bottom of tank which directly comes from the air into line of tank.**
- 2. Water tank fulfilled by water to collect the impure particle of air.**
- 3. It is huge tank to used the store the water and after the purification can reuse for many purposes like harvesting , cleaning etc.**
- 4. Made of tough steel or cemented.**
- 5. All the pipeline of purifier directed connected to the main pile line of tank.**
- 6. Two filter are also connected to the tank for filtration of water for reuse purpose .**

#### **DESIGN:-**

HEPA filter are designed based on the size of particles to be removed and the required air flow rate. The finer the pores in the HEPA material ,the finer the particles removed from the air. However , collecting finer particles means the filter material will clog sooner and need replacing on a more frequent basis. The designer will specify the diameter of the glass fibers and the mat density of the filter fabric that fixes the filter pore size. HEPA filter can contain binders that provide additional strength but this also produces a filter that clogs sooner.

Design of an electrostatic precipitators is considerably more complex. Home electrostatic precipitators usually are designed to have two components an ionizing component and a collecting component. The collecting component consists of a series of parallel steel plates half are grounded and half carry a positive direct current voltage thus alternate plates are either positively or negative charged. The ionizing unit consists of thin wires strung between a separate set of grounded steel ionizing plates parallel to but set in front of the collector plates. The thin wires carry a very high positive voltage direct current upto 25000 volts in home air purifiers. The positive charges in the wire induce a flow of electron between the wires and the adjacent ionizing plates. Because there is a very high voltage on the wire, electron are pushed toward it by an acceleration of around 1,000 time the acceleration of gravity which accelerates the electrons to very high velocities.





(Settling Water Tank)

### The Future:-

As scientist learn more about environmental pollutants and their impact on human health, the need to provide cleaner air in homes and offices will only grow. The current generation of HEPA filters can only remove particles down to 0.3 microns (0.00001 in,0.0003mm) in diameter while it is believed that particles down to 0.01microns (0.0001mm) in diameter can cause mechanical damage to lung tissue. Viruses can be as small as 0.02 microns (0.00002mm)in diameter. Clearly, there is still progress that can be made in controlling indoor air pollution. The current direction of technology is towards ever finer filter materials.