COZY BREATH WITH EF PURIFIER

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Introduction

Introduction: Exhaust gases are fuel gases is emitted as a result of combustion of fuel such as natural gases Gaseloine, petrol, bio diesel fuel etc.

According to the type of engine it is discharged into the atmosphere through an exhaust pipe. Fuel gas stack are propelling nossil it often disperse downwind in a pattern called exhaust plume.

It is a major component of motor vehicle emission (and from stationary internal combustion engine) which can also include

- Crankcase blow by
- Evaporation of unused gasoline

Motor vehicle emission contribute to air pollution and are a major ingredients in a creation of smug. In some large cities a 2013 study by MIT indicate that 53000 early death occur per year in the United States alone because of vehicle emission. According to another study from the same university traffic fume alone caused the death of 5000 people per year in Delhi.

hypothesis

Observation: Around 53000 death occurs every year due to motor vehicle emission contributing to air pollution, such as smog in some large cities.

Question: How to control smog released from vehicles causing air pollution?

Hypothesis: Controlling the smog by using Hepa filter, Ufpa filter and Converter Tube.

Composition: Nitrogen, Carbon Dioxide, Water vapour, these are non toxic or noxious, Nitrous Oxide, Hydro Carbons, Carbon Monoxide these are toxic substances

Relatively small part of combustion gases is undesirably noxious or toxic. Substance such as Carbon Monoxide from incomplete combustion Hydro carbons from unburned fuel, Nitrogen oxide from excessive combustion. Temperature and particulates matter.

Constants and variables:

- Hepa Filter
- Ulpa Filter
- Glass wool
- Converter Tube
- Aluminium Oxide
- Ceria

MATERIALS REQUIRED

Material required:

- Hepa Filter 100 cm^2
- Glasswool
- Ulpa Filter 50 cm^2
- Convertor Tube
- Aluminum oxide
- Ceria
- Palladium for oxidation purpose
- Rhodium

Method:

Make exhaust control box of area 600 cm^2

The box consists of 3 chambers

First chamber consist of Glass wool which reduces sound pollution and traps dust particles.

Second chamber consist of HEPA (High Efficiency Particulate Air) filter

The Hepa Filter can trap the PM-10 particles which are having diameter < 10 micro meters.

The third chamber consist of ULPA (Ultra Low Particulate Air) Filter

The ULPA filter can trap PM-0.01 particles which are having diameter <0.01 micrometers.

The Soot particles are trapped in HEPA and ULPA filter.

After the third chamber a convertor tube is placed which converts toxic gases into non-toxic gases.

This convertor tube consists of 3 layers.

First layer consists of Aluminum Oxide, Second layer consist of Rhodium and the third layer consists of Palladium.

When the toxic gases are passing through the convertor tube they are reacted with Hydrogen and Oxygen.

Ceria is used as an Oxygen promoter.

$NO_x + O \longrightarrow NO_2$

$HC + O \longrightarrow H_2O$

$CO + O \longrightarrow CO_2$

Arrangement of filter is in the following manner.

1) Monolith Filter
2) Glasswool
3) HEPA Filter
4) ULPA Filter
5) Ceria
6) Platinum
7) Palladium
8) Rhodium

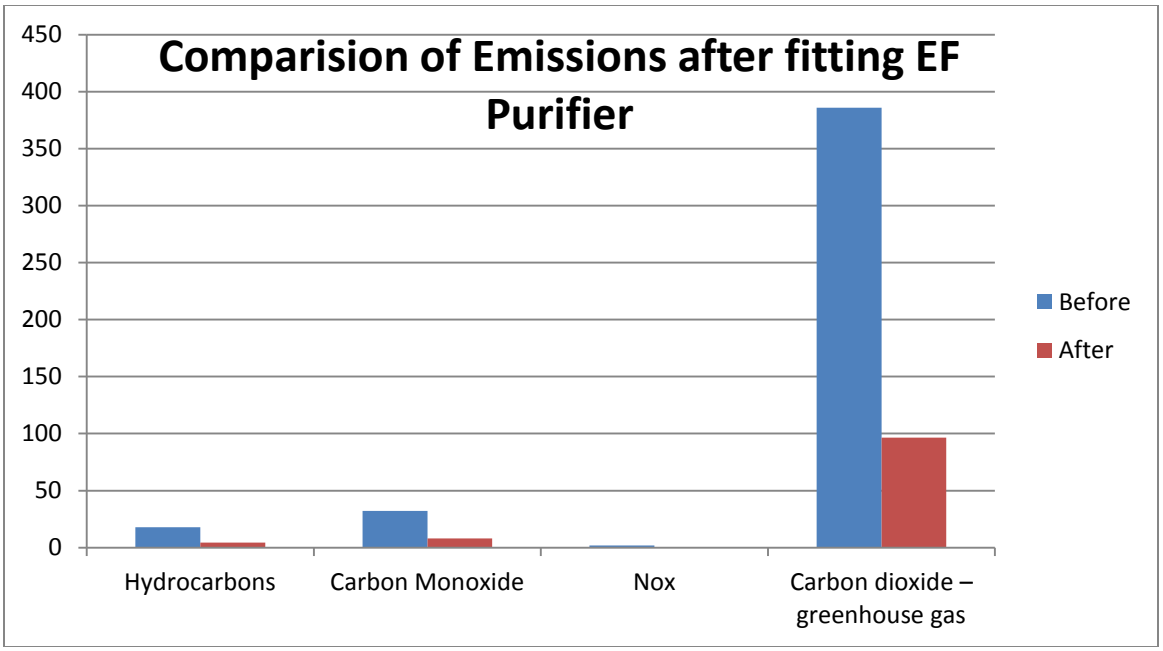
The converter box is placed third of the way from danger where they placed under the vehicle.

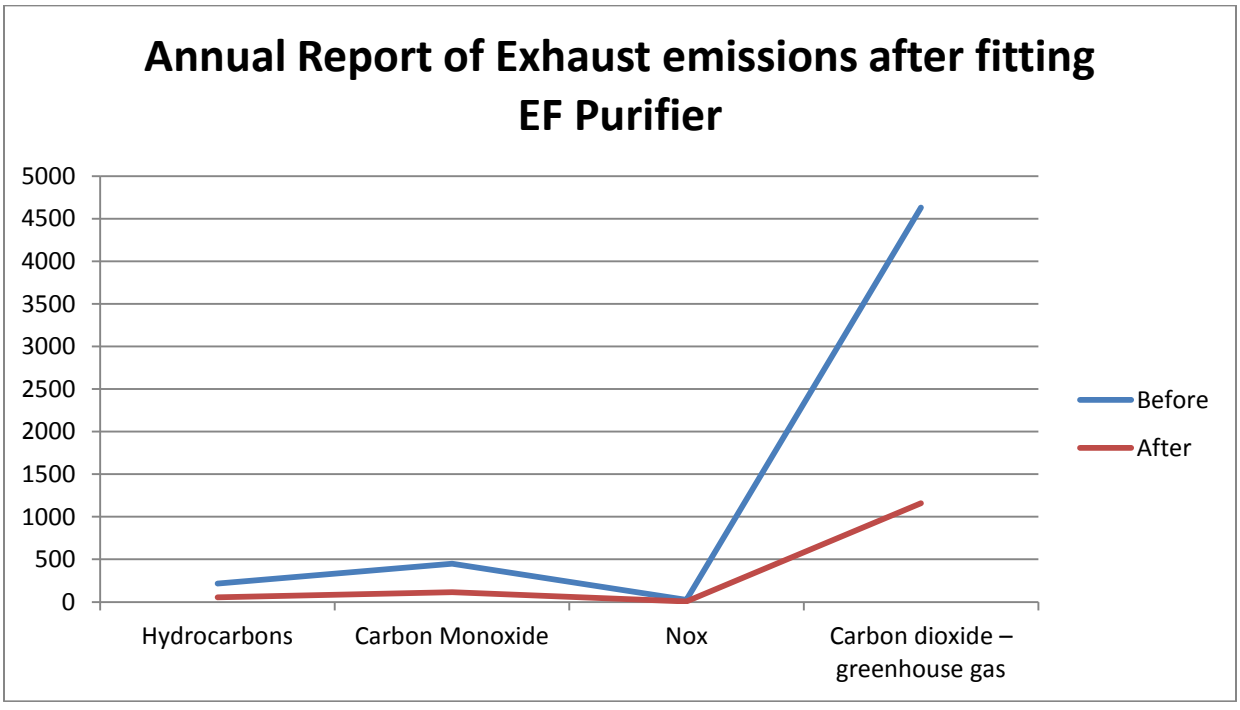

RESULTS

Result:

Exhaust emission before fitting of EF Purifier		
Component	**Emission Rate**	**Annual Pollution emitted**
Hydrocarbons	18 g/km	216 Kg
Carbon Monoxide	32.08 g/Km	450 Kg
No_x	1.97 g/Km	23.64 Kg
Carbon dioxide – greenhouse gas	386 g/Km	4632 Kg

Exhaust emission after fitting of EF Purifier		
Component	**Emission Rate**	**Annual Pollution emitted**
Hydrocarbons	4.5 g/km	54 Kg
Carbon Monoxide	8.02 g/Km	113 Kg
No_x	0.0525 g/Km	5.91 Kg
Carbon dioxide – greenhouse gas	96.5 g/Km	1,158 Kg


Comparision of Emissions after fitting EF Purifier
450
400
350
300
250
200
150
100
50
0
Hydrocarbons
Carbon Monoxide
Nox
Carbon dioxide – greenhouse gas
Before
After


Annual Report of Exhaust emissions after fitting EF Purifier
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Hydrocarbons
Carbon Monoxide
Nox
Carbon dioxide – greenhouse gas
Before
After

Conclusion:

Exhaust emission control was achieved up to 85%.

Bibliography:

www.google.co.in