

DETERMINATION OF THE TOTAL CONCENTRATION OF EXHAUST GASES RELEASED DURING THE MOVEMENT OF VEHICLES

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Abstract: Currently, exhaust gases emitted by motor vehicles are one of the factors affecting environmental change. This article presents conclusions and suggestions on determining the total concentration of exhaust gases released during the movement of motor vehicles, their impact on environmental change, and ways to eliminate them.

Key words: Motor transport, exhaust gases, environment, factor, carbon oxides, nitrogen oxides, hydrocarbons.

Enter: The main source of exhaust gases is the internal combustion engine. These are substances with different chemical and physical properties in the form of non-homogeneous gas as a result of full or partial combustion of fuel, air and various micromixtures, which fall into the exhaust system of the engine cylinder. Processed gases contain more than 300 different substances, most of which are poisonous gases. The main toxic components of exhaust gases from car engines are carbon oxides, nitrogen oxides and hydrocarbons. In addition to these, restricted and unrestricted aldehydes and carcinogenic substances are released into the atmosphere together with the processed gases. The amount of CO₂ produced by a particular vehicle depends on many factors. However, taking into account the entire transport sector, passenger cars emit the largest amount of carbon dioxide. Road transport accounts for 72% of total emissions, and passenger cars up to 60.7% (European Parliament data, 2016). Thus, it is 43.7% of the total figure. This is significantly more than sea transport (13.6% of the total) or air transport (13.4%).

Currently, the population of Uzbekistan has more than 4 million cars. According to the departmental data of the Statistics Agency, as of January 1, 2024, the number of cars owned by individuals in Uzbekistan was 4,020,744.

From the total number of motor vehicles owned by the population:

Passenger cars-3,759,045;

Trucks-240,917;

Buses-6,297

Minibuses-9,102;

Special vehicles-5,383.

Thus, the statistics for passenger transport emissions in the coming decades are not optimistic – they are expected to remain at the same level or even increase instead of decreasing.

Engines running on ethylated gasoline have lead in the exhaust gases, and soot in diesel engines. Carbon monoxide (CO- gas) is transparent, odorless, poisonous, lighter than air, poorly soluble in water.

Carbon monoxide is a product of incomplete combustion of fuel, which burns with a bluish flame when carbon dioxide is formed in the air. In the engine combustion chamber, CO is formed as a result of insufficient fuel injection, cold flame reaction, combustion of fuel with insufficient oxygen and dissociation of carbon dioxide at high temperatures. During combustion after ignition (after the high end point, during the expansion stroke), when dioxide is formed, it mixes with oxygen and burns carbon monoxide. In this case, the burning of CO continues in the outlet pipeline. It should also be taken into account that when operating diesel engines, the amount of CO in the exhaust gases is low (about 0.1-0.2%), so the amount of CO is determined only for gasoline engines.

Nitrogen oxides (NO, NO₂, N₂O, N₂O₃, N₂O₅, later-NO_x). One of the more toxic components of exhaust gases from cars is nitrogen oxide. Under normal atmospheric conditions, nitrogen is like an inert gas. At high pressure and high temperature, nitrogen actively reacts with oxygen. Azor oxide NO makes up 90% of NO_x in engine exhaust gases, which is oxidized to nitrogen dioxide NO₂ in the atmosphere after the exhaust system.

Hydrocarbons (C_nH_m- methane, ethane, propane, ethylene, benzene, styrene, etc.).

Hydrocarbons are organic compounds whose molecules consist only of carbon and hydrogen atoms and are considered toxic substances. Processed gases contain more than 200 different hydrocarbons, divided into aliphatic and aromatic rings.

Hydrocarbons and nitrogen oxides create conditions for the formation of smoky fog (smog) in special meteorological conditions.

Smoky fog (smog-smoke, fog-fog) is a toxic fog that forms in the lower layer of the atmosphere, toxic substances from production enterprises, waste gases from motor vehicles and other devices create smoky fog in unfavorable weather conditions. Their composition is an aerosol consisting of smoke, fog, dust and a part of liquid. Poisonous gases entering the atmosphere react with each other and form new poisonous gases.

At this time, photosynthesis, oxidation, regeneration, polymerization, condensation, catalysis and other reactions take place in the atmosphere. Nitrogen oxides, hydrocarbons, aldehydes and other substances react with the sun's ultraviolet rays to form photooxidants as a result of complex photochemical processes.

The impact of exhaust gases on the environment and human health is increasing. Exhaust gases are the working product developed in the engine. It is an incompletely burned hydrocarbon fuel and oxidation product. The release of exhaust gases causes an increase in the permissible concentration of toxic substances and carcinogens in the atmosphere.

In order to reduce the volume of toxic emissions: the need to achieve the possibility of high-speed operation from engines with low fuel consumption that organizes movement well is one of the current topics. Therefore, finding a technical solution to environmental problems is being implemented in three directions in world practice: the system of reducing the toxicity of fuel, engine

and exhaust gases. One of the ways to reduce the toxicity of exhaust gases is to use compressed and liquefied gases as fuel.

Currently, the direction of the future and effective strategic environmental initiative is to make changes to the engine design. The widespread use of injection engines, electronic control systems and improvement of the working process of the engine have raised economy and environmental indicators to a new quality level. If we look at the concept of inventing an ecological engine, as a result of 30 years of research in world practice, only various forms, interesting projects and constructions have been proposed. Currently, hybrid power devices are used, which are the most efficient in terms of economy and environmental parameters; they work on highways with an internal combustion engine, and in urban areas they work with an electric engine. Switching to one or another engine type is carried out automatically depending on traffic and road conditions.

Detoxification of exhaust gases The following measures are recommended to reduce the toxicity of gases:

- Improving the design of the engine and, first of all, redesigning the parts that make up the combustion chamber, supply and ignition systems.
- Use of gasoline with a low content of tetraethyl lead, transition to gaseous fuels and hydrogen fuels.
- Recirculation of used gases.

If a part of the used gas from the exhaust gas detoxification system is diverted to the input collector, providing a relatively high heat capacity of the combustion products and reducing NOx formation. The institute is conducting work in these areas, and as a result of their introduction, high technical, economic and environmental efficiency is achieved. For example, by adding 5-6% of Brown's gas to the main fuel, gasoline fuel consumption can be reduced by 30-35%, diesel fuel consumption by 25-30%, and compressed gas consumption by 15-20%. has been achieved. Also, the amount of carbon monoxide CO in the processed gases decreased by 60-70% and the amount of unburned hydrocarbons by 40-50%.

Summary:In short, in order to prevent the ecological degradation of natural ecosystems by the organizers of motor vehicles, to develop a system of organization according to scientifically based ecological requirements, to regulate the harmful effects of the complex of motor vehicles on the environment, to create ecological risks. the introduction of requirements for emitting sources is to ensure that they do not exceed certain threshold amounts. In order to reduce the harmful effects of vehicles on the environment, it is necessary to create mathematical models of the process of exchange of matter and energy between vehicles and the environment and to find solutions that satisfy the relevant conditions.

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