коефіцієнту запасу опору втомі виявлено у зоні зварного з'єднання кронштейну гасника коливань з боковиною та становить n = 2,41.

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USE OF OZONATION IN THE EXHAUST GAS RECIRCULATION SYSTEM OF ICE

ВИКОРИСТАННЯ ОЗОНУВАННЯ У СИСТЕМІ РЕЦИРКУЛЯЦІЇ ВІДПРАЦЬОВАНИХ ГАЗІВ ДВЗ

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Bypassing part of the exhaust gases allows you to change the chemical composition of the fuel-air mixture, reduce the content of free oxygen in the combustion chamber. The efficiency of exhaust gas recirculation is explained by the presence of such components as water vapor and carbon dioxide in them. These substances have a high specific heat capacity, which helps to reduce the flame temperature in the combustion chamber and, accordingly, reduce the amount of nitrogen oxides in the exhaust gases. The use of up to 10% gas recirculation makes it possible to reduce the content of nitrogen oxides by approximately 30% without a noticeable increase in fuel consumption, although the smoke level increases slightly (by 5-10%).

At the same time, to simultaneously reduce toxicity and smoke level, different, sometimes incompatible measures are required, which significantly complicates the task of reducing harmful substances in exhaust gases, especially diesel engines. One possible solution is to combine a gas recirculation system with the ozonation method.

Ozone technologies for intensification of the combustion process make it possible to compensate for the shortcomings of existing methods for reducing the toxicity of exhaust gases from internal combustion engines. Ozone is a powerful natural oxidant that does not create dangerous or harmful impurities. Today it is widely used for

water purification and disinfection, removal of metal salts, deodorization of liquids, and air purification using modern generators.

In nature, ozone in its pure form exists only in the upper layers of the atmosphere; near the earth's surface it quickly decomposes into oxygen molecules, oxidizing surrounding substances. Thanks to this process, the air is purified from unpleasant odors and suspended particles. Ozone effectively eliminates odors of household chemicals, combustion products, gases, essential oils, benzene, and also neutralizes Freon-12, hydrogen sulfide, carbon disulfide, and other harmful substances.

In addition, during ozonation, biological air purification is carried out - bacteria and microorganisms are destroyed, which is especially important for medical institutions and public spaces. After the reactions are completed, ozone decomposes into oxygen, enriching the air.

One of the known methods of gas purification is the use of a nanosecond streamer corona discharge. Polluted air is passed through a reaction chamber, into which high-voltage pulses of such a short duration are applied that the chamber does not break down. As a result, an intense pulsed corona discharge occurs, forming many thin luminous channels - streamers. In the zone of their development, a large number of high-energy electrons are formed, which, interacting with gas molecules, contribute to the formation of active chemical particles, in particular ozone, which provides purification.

The use of a pulsed corona discharge for the decomposition of harmful gaseous compounds is a promising method. Experimental studies confirm that in the zone of such a discharge, the destruction of volatile organic compounds occurs, as well as the oxidation of sulfur and nitrogen oxides (NO_x, SO_x) and other impurities characteristic of exhaust gases of internal combustion engines.

The main characteristics of the cleaning process are the degree of cleaning and the amount of energy required to process 1 m³ of gas. When using a pulsed corona discharge, the level of cleaning can reach 90-95% and depends mainly on the amount of energy I ntroduced into the gas. This dependence can be both linear and nonlinear.

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FACTORS CONSIDERED WHEN ASSESSING WEAR OF INTERNAL COMBUSTION ENGINE CYLINDERS

ФАКТОРИ, ЩО ВРАХОВУЮТЬСЯ ПРИ ОЦІНЦІ ЗНОСУ ЦИЛІНДРІВ ДВИГУНІВ ВНУТРІШНЬОГО ЗГОРАННЯ

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Determining cylinder wear using calculation methods and predicting engine durability are of great practical importance. In addition, knowledge of the wear diagram of designed engines is necessary for the development of optimal cylinder manufacturing technologies that ensure maximum engine life during operation. Obtaining an operational wear diagram for new engines requires a significant amount of time and high material costs. To achieve reliable results, it is necessary to conduct research on many engines over a long period. Creating a mathematical model for calculating cylinder wear significantly speeds up the process and reduces costs, allowing you to obtain the necessary data several times faster and cheaper. However, to date, there is no single and reliable method for calculating cylinder wear. This is due to the large number of factors that affect the wear of internal combustion engine cylinders, and their different effects on different engines and in different operating conditions. All factors that affect the intensity of cylinder wear can be conditionally divided into two groups: internal and external. Internal factors include those that cannot be changed during operation, in particular: the design features of the engine and the physical and mechanical properties of the rubbing materials (bushings, rings, piston). External factors include a large number of variable parameters that can vary during operation, such as: used oils, air, fuel and oil purity, operating modes (load, speed, temperature), as well as indicator parameters of engine operation (compression ratio, boost ratio, maximum combustion pressures, gas temperatures, etc.).

The main problem is that external factors that affect the friction of piston rings against the cylinder vary along the height of the cylinder and differ at different points in it. Even when all internal and external factors are taken into account, cylinder wear is caused by friction between the piston rings (which can be from 3 to 8 per piston) and the piston. Each ring operates under different friction conditions and in different