

PROSPECTS FOR THE TRANSFER OF DIESELS TO COMPRESSED NATURAL GAS FUEL

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Abstract

the re-engineering of diesel engines into gas burners is becoming more and more popular at the moment. This is not surprising, because such retrofitting leads to great benefits to ecology and the environment and economic savings..

Keywords: diesel, compressed natural gas, gasoline, engine operating indicators, diesel engines, environmentally friendly fuels.

There are many reasons for retrofitting diesels to use compressed natural gas. The first and most important is the solution to the fuel resource problem, the next is the solution to the environmental pollution problem. Compressed natural gas is more resource-intensive and more cost-effective than diesel fuel. This makes it possible to reduce the costs in the operation of transport energy devices with a car or diesel engine. For being an environmentally friendly fuel compared to petroleum products, compressed natural gas and liquefied petroleum gas fuels can be recognized as modern alternative fuels. Therefore, the popularization of the use of gaseous fuels reduces harmful substances released into the atmosphere and contributes sufficiently to the protection of the environment.

Re-equipping diesels into compressed natural gas requires the installation of special equipment that allows the engine to run on gas. Usually this is done by specialized service centers that install gas cylinder equipment, gas reducer and other components necessary in the transition to the use of gaseous fuels.

However, before deciding to transfer diesels to gas fuel, some factors must be taken into account. First, the installation of gas equipment can significantly increase the weight of a car or other equipment, which can affect its performance and fuel consumption. In addition, it is possible to notice a decrease in the power of engines running on gas fuel compared to diesel engines. The main reason for this is the introduction of a partial change in the design of engines transferred to the gas burner, that is, a reduction in the degree of compression.

In order to transfer diesel cars to gas fuel, it is necessary to obtain the permission of the relevant state bodies, since compressed natural gas can endanger the lives of people in the case of improper operation of cars, which are equipped with a fuel supply. In addition, the transition to gas fuel, as well as equipment related to the installation, maintenance and filling of gas equipment, requires a large amount of investment. But the cost of transferring diesel cars to compressed natural gas fuel will be covered in the process of operating these cars.

Despite all the above factors, it remains useful to transfer diesels to gas fuel. It is cost-effective, helps to reduce the harmful effects of cars on the environment, develop the transition to an environmentally friendly type of fuel and rationally use the available resources in our country.

The retrofitting of diesels to compressed natural gas (CNG) or liquefied petroleum gas (LPG) is the reconfiguration of the fuel supply system in the engine. This is useful for reducing noise levels calculated from environmental impacts, as well as saving fuel-lubrication costs.

The main stages of transferring diesels to gas fuel include:

1. Adjusting the cylinder-piston group details of the diesel engine to the gas burner (reducing the degree of compression) and installing a fuel supply system for compressed natural gas or liquefied petroleum gas. This process may require partial changes to the body and rama section of the car to accommodate new equipment and gas balloon equipment.
2. Adaptation of the fuel supply system, including gas cylinders for compressed natural gas or liquefied oil fuel, pressure regulator, injectors, gas cartridges, gas equipment electronic control unit, sensors, electrical cables, etc.
3. Changing and adjusting the electronic control system to determine and control the power of the engine, changes in the system.
4. Finishing work and checking the system. After installing the new equipment and installing the electronic control system, it will be necessary to test the re-equipped car by biting it into work and make sure that the system works correctly.

The comparison of the environmental performance of diesel and gas engines depends on several factors, including harmful substances and greenhouse gas emissions, operating costs and energy efficiency.

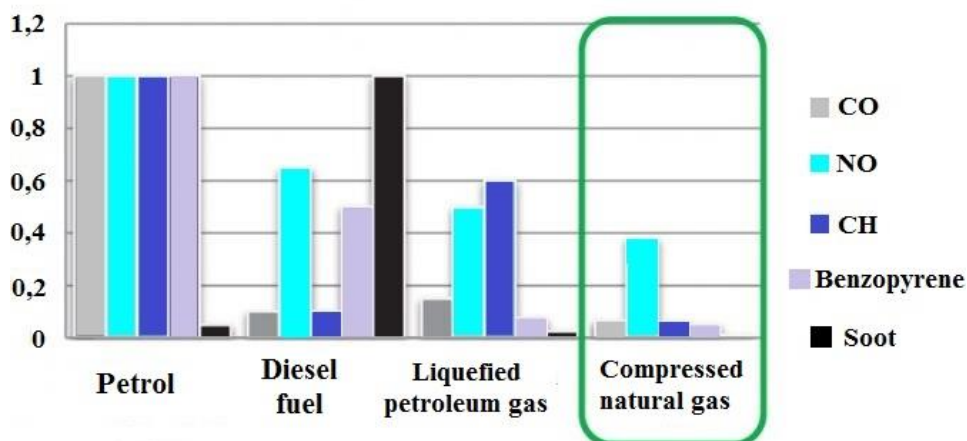
Exhaust gases and harmful substances: diesel engines usually emit more particles of nitrous oxide and soot and solids than gas engines. However, modern diesel engines can be equipped with exhaust gas treatment systems that comply with strict emission regulations and significantly reduce emissions.

Operating costs: gas engines usually require less maintenance and have a long service life, which can lead to a decrease in operating costs. However, diesel engines are usually more efficient when using fuel and can have higher power and torque.

Energy efficiency: diesel engines have higher energy efficiency compared to gas engines. This means that diesels use fuel more efficiently and can be able to bisect a longer distance in a single fuel tank.

In general, the choice of diesel and gas engines should be based on certain needs and operating conditions. Both types can be environmentally friendly with proper maintenance and the application of modern exhaust gas treatment systems.

Simplifies the ratio of harmful substances that are excreted when using various fuels.



At this point, let's go briefly on different fuels.

Gasoline: gasoline is the most common type of fuel used in light cars. It has high energy efficiency and high combustion rate. This allows gasoline-powered vehicles to reach high speeds and ensures fast mileage. Gasoline fuel has a low viscosity, improving fuel supply to the engine and reducing engine corrosion. However, one of the disadvantages of gasoline is its high cost, as well as a source of high emissions of carbon dioxide and other harmful substances.

Gas: compressed natural gas(CNG) or liquefied petroleum gas (LPG) are among the increasingly popular alternative fuels. These are gaseous fuels. Unlike gasoline, gas burners, especially compressed natural gas burners, have a lower cost, which is an attractive choice for many car owners and large fleet businesses. The gas burner is also considered clean in terms of ecology, as it releases less carbon dioxide, hydrocarbons, nitrogen oxides compared to base oil burners, and there is hardly any soot. However, gas has less energy efficiency and requires special equipment and equipment for use in cars.

Diesel: diesel fuel has the highest energy efficiency among three types of fuel. Diesel engines typically have higher torque and fuel economy than gasoline engines. Despite its low flammability, diesel also allows it to be used in a variety of homogeneous conditions, including in cold climatic zones. However, diesel has more soot and nitrous oxide emissions coming to Yusa than any other fuel. In addition, it has a higher price than gasoline.

As a result, the choice of fuel depends on many factors, including the type of car, climatic conditions and economic advantages. Gasoline, gas and diesel have advantages and disadvantages, and the optimal solution can vary in different situations. When choosing fuel, it is important to take into account energy efficiency, environmental consequences and economic costs.

The transfer of diesel engines to gas fuel causes several problems:

Changes in engine characteristics: diesel and gas-fueled engines have different characteristics such as torque, power and efficiency. The transfer of diesel to gas fuel can lead to loss of power and overheating of the engine.

Technical limitations: require modification of many components of diesel engines, such as: fuel supply system, lubrication system and cooling system, to operate in gas fuel. This can require a large modification and lead to additional costs. The transfer of diesel to gas fuel requires a special filling station for gas.

Environmental impact aspects: while gas fuel is considered more environmentally friendly than diesel fuel, gas transfer does not address all environmental pollution issues. In the process of gas production and extraction, other types of waste also appear, and there is a risk of gas leakage, which can be harmful to the environment.

Economic aspects: transferring to gas fuel can be an expensive process, including the cost of changing engines, the high cost of installation, having special filling stations, etc.

For the long-term operation of the engine, this is still not enough. The compression ratio that is allowed for the ignition of diesel fuel is too large for methane, the octane number of which is 120. If the unit is operated without the necessary further improvements, then detonation will occur subsequently. It will eventually cause engine failure.

For the long-term service of the power plant, the compression level should be reduced to 12-14. This is achieved by increasing the internal volume of the combustion chamber. Alternatively, piston bottoms or combustion chambers of the block head are drilled. So that the structure does not break during ignition, it must be borne in mind that only a small layer of metal can be removed. If metal boring is not enough to increase the volume of the chamber, then additional gaskets are installed under the cylinder head.

After the reconstruction, little remains of the diesel engine, so the upgraded design is called a gas engine. The technical characteristics of the converted diesel unit are comparable to a gasoline engine converted to gas fuel (subject to the compression level of 12-14). As a result, its efficiency increases, the

amount of harmful emissions decreases, and the life of the motor increases significantly. To run the engine on gas fuel, you need to fill it only with gas.

Gas cylinder equipment is used not for the sake of experiment, but to save money. There is a relationship between the difference in fuel consumption and the price of diesel fuel-gas. The payback period of HBO may depend on the "voracity" of the motor. Diesel units are quite economical, so when switching from a diesel engine to gas fuel, you need to understand that the benefit for passenger cars will be significant only at high mileage. In the case of trucks, the benefit from installing HBO is obvious due to the significant fuel consumption.

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