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Research Article

THE MAIN FACTORS THAT INCREASE THE THERMAL LOAD OF GAS ENGINES

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ABSTRACT

In this article, the increase in the thermal load of engines running on gas fuel is considered. Simply put, after starting a cold engine, it first heats up, after which the processes of keeping the heat within the specified limits of the cooling system are studied.

KEYWORDS

Gas, engine, heat, system, cooling, air, liquid.

INTRODUCTION

As a rule, many modern engines operate in the coolant heating range, which is on average 85-100 °C. This means that the cooling system does not allow the coolant temperature to fall below the minimum mark and exceed the maximum limit [1-4]. The operating temperature of the engine must be kept constant because with such heating technical fluid shaves the necessary fluid, the spaces between the parts of the internal combustion engine will come to the design norm as a result of thermal expansion, and fuel will be consumed and burn most efficiently, etc.

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Given the above, it is clear that a healthy cooling system will always strive to maintain operating temperature [5-9]. At the same time, certain malfunctions can cause the motor to overheat both in summer and in winter [10-17].

THE MAIN PART

The only thing is that in the cold season, the maximum efficiency of the cooling system is not required due to the low outside air temperature. In this case, as a rule, the appearance of certain problems can be ignored until the outside temperature rises.

Thus, engine overheating usually results in cooling systems. The list of main reasons should include:

1. coolant leak;
2. violation of the integrity of the system;
3. obstruction of coolant circulation;
4. failure of elements of the cooling system;

Leaks and depressurization lead to a decrease in the level of coolant in the cooling system, airlocks and so on. A drop in the level in the expansion tank is clearly a cause for diagnosis. Pipes and hoses may burst, seals may be damaged, etc., and fluid may leak out. If the situation is urgent, then you can use the "stop-leak" type. In addition, in some cases, repairing the radiator will help [18-29].

Let's look at the deterioration of the coolant circulation through the channels. As a rule, the main reason is a radiator is clogged from the inside. The truth is that using poor quality, timely replacement filling liquids or ordinary water in the cooling system leads to the formation of scale in the cells of the radiator, and the accumulation of pollutants and deposits.

In addition, the outside of the cooling radiator can also be covered with a layer of dust and fluff. As a result, heat transfer in the radiator deteriorates, and together with clogged cells, the coolant does not cool properly. Therefore, it is necessary to periodically wash the radiator both inside and outside [30-37].

If we talk about breakdowns, a malfunction or complete failure of the pump will cause the liquid to stop circulating normally through the channels of the cooling system. This can be caused by a malfunction of the base driver, etc. To check, it is recommended to carry out maintenance and change this element strictly according to the rules.

As for the thermostat, the function of this element is to transfer coolant from a small circle (engine cooling jacket) to a large circle (through the radiator). Usually, when the engine warms up, the liquid circulates only in a small circle, after a certain warm-up, the thermostat opens a large circle [38-46]. If such an opening does not occur or the thermostat does not open completely, then the cooling water will enter a large circle and will not be able to cool in the radiator. As a result, the engine overheats. It should also be added that engine overheating can occur for other reasons. For example, cooling fan failure or low speed or maximum speed will usually cause the engine to "boil".

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You can also highlight the situations that occur. In this case, coolant leaking into the engine oil or gases from the combustion chamber begins to enter the cooling system [47-56].

Overheating of the engine is the carelessness of car owners who forget to remove the plug when it gets hot. For example, if the external temperature is left below 3-5 degrees, the internal combustion engine can still overheat.

If the driver overheated the engine: consequences for the engine. As a rule, experts distinguish several options for overheating the engine:

- weak or local;
- average overheating of the motor;
- severe overheating, resulting in failure and/or jamming of the internal combustion engine;

Figure 1. Engine burns due to overheating

In different cases, the consequences will depend on how much overheating is allowed. If the temperature rose but did not reach a critical level, and the driver noticed the problem in time and quickly turned off the device, there is a high probability that the engine will remain in good condition.

As a rule, in this case, the cause is the failure of the fan, the deterioration of the pump or the clogging of the thermostat.

If, before stopping, the overheated engine was running and did not jam, such overheating can be considered average. However, if steam is visible from under the hood, the temperature of the internal combustion engine on the instrument scale has risen to the red zone, and the consequences can be much more serious.

It's not just about being tired cylinder head gaskets, but also about the destruction, melting, deformation, the appearance of the mating plane of the cylinder head, valve plates, etc.

Sudden stalling of the engine is a sign of critical overheating. In this case, the device may simply stop due to damage to its parts and assemblies.

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Also, the piston can be stuck, which is manifested in the form of a sharp knock and a stoppage of the internal combustion engine.

The consequences of such excessive heat are fatal, melting and burning of the pistons occur, the molten material flows onto the cylinder walls. Engine oil overheats and cokes, loaded friction pairs are destroyed, and crankshafts melt. In some cases, it can break, pistons can go through the wall of the cylinder block, and so on.

As you can see, in the second case, rebuilding such an engine is usually not economically feasible. It turns out that an overheated and damaged engine requires a complete replacement with a new or contract power unit.

How to protect the engine from overheating. Most cars have a separate coolant temperature gauge located on the dashboard. However, not all drivers manage to notice the increase in heating in time and stop the engine while driving.

We also note that some cars are additionally equipped with an audible alarm that indicates an unacceptable increase in temperature, but this option is available only in some modern vehicles and even not always. Therefore, it is necessary to notice the characteristic signs in the movement that may indicate overheating.

CONCLUSION

First of all, you should develop the habit of periodically monitoring the temperature of the coolant on the dashboard while driving.

A low level of antifreeze or antifreeze in the system will prevent hot air from coming out of the furnace. Also, when the coolant is boiling, there will be no hot air supply from the interior heater. As a result of boiling, an airlock is formed in the system.

Overheating of the internal combustion engine causes it to appear in the engine. Engine knocking is characterized by a characteristic sound of "calling" when pressing the gas pedal. In parallel, the engine begins to lose a lot of power, which we can often detect by the appearance of extraneous knocks and noises.

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