ABSTRACT

We know that in all internal combustion engines it is used in the cooling system. In this article, we examined the definition and analysis of the main indicators of the cooling system with a decrease in the thermal load of gas engines.

KEYWORDS

Car, bus, transport, system, cooling system, gas, engines, air, ring, thermostat, liquid, antifreeze.

INTRODUCTION

Cooling through a small loop

In the scheme of the internal combustion engine cooling system, there are two circuits - small and large. It is similar to human anatomy - blood flow in the body. The liquid moves around a small circle when it needs to heat up the temperature quickly. The problem is that the engine can usually work normally in a narrow temperature range - about 90 degrees [1-4].

It cannot be raised because it would cause violations,fuel mixtureIt still burns. The fog contains the radiator of the cabin heater - after
that it should be as warm as possible in the car. The hot antifreeze is combined with the faucet. The place of installation depends on a particular car - in the cabin and do not have a motor, in the field of gloves, etc [5-9].

**Cooling through a large loop**

In this case, the main radiator is also included. It is installed on the front of the car and is designed for an emergency decrease in the temperature of the liquid in the engine. If the car has an air conditioner, then the radiator is installed nearby. Volga and Gazelle cars use an oil radiator, which is placed at the front of the car [10-17].

**Thermostat and its features**

It is difficult to say which element provides the most efficient circulation of liquid in the cooling system. On the one hand, the pump creates pressure and moves in the pipes with the help of antifreeze.

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**Figure 1. Details and elements of the cooling system.**

1-radiator; 2-liquid pump; 3-thermostat; 4-electronic fan;

5-fan temperature sensor; 6- hoses (pipe) connecting the engine and radiator; 7-antifreeze;
On the other hand, if there is no thermostat, the action takes place only in a small circle. So let’s look at the thermostat. The meaning of the word thermostat ("thermo - temperature", "stat - suspended, at a standard") means to hold the temperature at a standard. In car engines, this is an automatic valve, which, when running a cold engine, allows it to warm up quickly, adjusts the amount of liquid passing through the radiator, and serves to maintain the optimal temperature in the cooling system. In car engines, liquid and solid filler thermostats are used [18-30].

Running the cooling system is preheating. When the outside temperature is below -20°C, it becomes difficult to run any internal combustion engine. Therefore, the cooling system is heated before starting the engine. When the combustible mixture burns steadily in the boiler, the candle is disconnected. Hot air is sent to the cooling system and the liquid is heated. Advantages and disadvantages of liquid and air cooling systems [31-39]. A liquid cooling system has the following advantages over air cooling:

a) due to the boiling temperature of the liquid used is 100-110 °C, the engine parts do not overheat;

b) the liquid partially absorbs the sound of the engine;

c) the engine heats up faster when driving;

d) the structure of the cooling system is smooth and compact. The advantages of the air cooling system are as follows:

- it is simple and light, since there is no liquid pump, radiator, water pipe, thermostat in the system;
- since the engine does not have a liquid casing, it does not freeze;
- the engine can also be used in places where there is no water.

Limit temperature of the main parts of the engine

<table>
<thead>
<tr>
<th>Engine details</th>
<th>Threshold temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall of cylinders</td>
<td>383...453 °K</td>
</tr>
<tr>
<td>The inner surface of the cylinder head</td>
<td>423...533 °K</td>
</tr>
<tr>
<td>Piston bottom</td>
<td></td>
</tr>
<tr>
<td>- if it is made of cast iron</td>
<td>673...773 °K</td>
</tr>
<tr>
<td>- in case of aluminum alloy</td>
<td>523...673 °K</td>
</tr>
<tr>
<td>Intake valve plate</td>
<td>573...673 °K</td>
</tr>
<tr>
<td>Exhaust valve plate</td>
<td>873...1073 °K</td>
</tr>
<tr>
<td></td>
<td>°C 110...180</td>
</tr>
<tr>
<td></td>
<td>°C 150...260</td>
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<tr>
<td></td>
<td>°C 400...500</td>
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<td>°C 250...400</td>
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<tr>
<td></td>
<td>°C 300...400</td>
</tr>
<tr>
<td></td>
<td>°C 600...800</td>
</tr>
</tbody>
</table>

The main disadvantage of the liquid cooling system is that water freezes at 0 °C, forming cracks in the block and block head. Deposits form in the water jackets of the block, the radiator
tubes can be filled with deposits [40-58]. The main disadvantage of air cooling is that:

a) when the outside air temperature exceeds 30 °C, the engine will overheat;

b) cylinder ribs are contaminated with dust;

c) the fan bearing will fail quickly.

The lower limit of the quoted temperature is specified for liquid-cooled engines, and the upper limit is specified for air-cooled engines. So, in order for the engines to work normally, the economic and power indicators to be in the specified amount, and the mechanical indicators of the parts not to decrease, it is necessary not to let the temperature of the parts and the engine rise above the specified amount. For this, a cooling system is used in all piston engines. The function of the cooling system is to maintain the temperature of the engine and its parts at a normal level by absorbing the temperature from the heated parts and transferring it to the atmosphere.

Depending on the means of heat transfer to the atmosphere, engines are of two types.

1. Engines with a liquid cooling system.

2. Engines with air cooling system.

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