



 Research Article

## DETERMINATION OF THE MAIN PARAMETERS OF THE COOLING SYSTEM WITH A DECREASE IN THE THERMAL LOAD OF GAS ENGINES

Journal Website:  
<http://sciencebring.com/index.php/ijasr>

Copyright: Original content from this work may be used under the terms of the creative commons attributes 4.0 licence.

Submission Date: May 03, 2023, Accepted Date: May 08, 2023,

Published Date: May 13, 2023

Crossref doi: <https://doi.org/10.37547/ijasr-03-05-03>

**Tursunali Nishanov**

Assistant, Fergana Polytechnic Institute, Fergana, Uzbekistan

**Sardor Khujamqulov**

Assistant, Fergana Polytechnic Institute, Fergana, Uzbekistan

### 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 mixture it 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.



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  $-20^{\circ}\text{C}$ , 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  $100-110^{\circ}\text{C}$ , 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 1.**

<i>Engine details</i>	<i>Threshold temperature</i>	
	$^{\circ}\text{K}$	$^{\circ}\text{C}$
Wall of cylinders	383...453	110...180
The inner surface of the cylinder head	423...533	150...260
Piston bottom		
- if it is made of cast iron	673...773	400...500
- in case of aluminum alloy	523...673	250...400
Intake valve plate	573...673	300...400
Exhaust valve plate	873...1073	600...800

The main disadvantage of the liquid cooling system is that water freezes at  $0^{\circ}\text{C}$ , 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.

## REFERENCES

1. С.М.Ходжаев, М.С.Низомиддинова, Ч.О.Камбарова, & Н.С.Ходжаева (2022). Организация станции технического обслуживания при Ферганском

- политехническом институте. Science and Education, 3 (10), 265-274.
2. Khodjaev, S. M. (2022). The main problems of organization and management of car maintenance and repair stations in the Ferghana region. Innovative Technological: Methodical Research Journal, 3(9), 1-10
3. Maxmudov, N. A., Ochilov, T. Y., Kamolov, O. Y., Ashurxodjaev, B. X., Abdug'aniev, S. A., & Xodjayev, S. M. (2021). TiN/Cr/Al<sub>2</sub>O<sub>3</sub> and TiN/ Al<sub>2</sub>O<sub>3</sub> hybrid coatings structure features and properties resulting from combined treatment. Экономика и социум, (3-1), 176-181.
4. O'G, G. O. U. B., Jaloldinov, L., Otabayev, N. I., & Xodjayev, S. M. (2021). Measurement of tires pressure and load weight on the. Academic research in educational sciences, 2(11), 1055-1061.
5. Xujamkulov, S., Abdubannopov, A., & Botirov, B. (2021). Zamonaviy avtomobillarda qo'llaniladigan acceleration slip regulation tizimi tahlili. Scientific progress, 2(1), 1467-1472.
6. Xujamqulov, S. U., Masodiqov, Q. X., & Abdunazarov, R. X. (2022, March). Prospects for the development of the automotive industry in uzbekistan. In E Conference Zone (pp. 98-100).
7. Meliboyev, A., Khujamqulov, S., & Masodiqov, J. (2021). Univer calculation-experimental method of researching the indicators of its toxicity in its management by changing the working capacity of the engine using the characteristics. Экономика и социум, (4-1), 207-210.



8. Fayziev, P. R., Tursunov, D. M., Khujamkulov, S., Ismandiyarov, A., & Abdubannopov, A. (2022). Overview of solar dryers for drying lumber and wood. *American Journal Of Applied Science And Technology*, 2(04), 47-57.
9. Xujamqulov, S. U. O. G. L., & Masodiqov, Q. X. O. G. L. (2022). Avtotransport vositalarining ekspluatatsion xususiyatlarini kuzatish bo'yicha vazifalarni shakllantirish. *Academic research in educational sciences*, 3(4), 503-508.
10. Masodiqov, Q. X. O. G. L., Xujamqulov, S., & Masodiqov, J. X. O. G. L. (2022). Avtomobil shinalarini ishlab chiqarish va eskirgan avtomobil shinalarini utilizatsiya qilish bo'yicha eksperiment o'tkazish usuli. *Academic research in educational sciences*, 3(4), 254-259.
11. Khujamkulov, S. U., & Khusanjonov, A. S. (2022). Transmission system of parallel lathe machine tools. *ACADEMICIA: An International Multidisciplinary Research Journal*, 12(2), 142-145.
12. Umidjon o'g'li, K. S., Khusanboy o'g'li, M. Q., & Mukhammedovich, K. S. (2022). The formation of tasks for overview of operating properties of vehicles. *American Journal Of Applied Science And Technology*, 2(05), 71-76.
13. Khujamqulov, S. (2022). A method of conducting experiments on the production of car tires and the disposal of obsolete car tires. *Science and innovation*, 1(A3), 61-68.
14. Qobulov, M., Jaloldinov, G., & Masodiqov, Q. (2021). Existing systems of exploitation of motor vehicles. *Экономика и социум*, (4-1), 303-308.
15. Ogli, K. S. U. (2022). Analysis of passenger flow of bus routes of fergana city. *International Journal of Advance Scientific Research*, 2(10), 32-41.
16. Khujamqulov, S. (2022). Analysis Of Existing Methods and Means of Monitoring the Technical Condition of Motor Vehicles. *Eurasian Journal of Engineering and Technology*, 9, 62-67.
17. Сотволдиев, У., Абдубаннопов, А., & Жалилова, Г. (2021). Теоретические основы системы регулирования акселерационного скольжения. *Scientific progress*, 2(1), 1461-1466
18. Ismadiyrov, A. A., & Sotvoldiyev, O. U. (2021). Model of assessment of fuel consumption in car operation in city conditions. *Academic research in educational sciences*, 2(11), 1013-1019.
19. Абдурахмонов, А. Г., Одилов, О. З., & Сотволдиев, У. У. (2021). Альтернативные пути использования сжиженного нефтяного газа с добавкой деметилового эфира в качестве топлива легкового автомобиля с двигателем искрового зажигания. *Academic research in educational sciences*, 2(12), 393-400.
20. Abduraxmonov, A., & Tojiboyev, F. (2021). Korxonada shinalar va harakatlanuvchi tarkibni tahlil qilish va tekshirilayotgan harakat tarkibining xususiyatlari.



- Academic research in educational sciences, 2(11), 1357-1363.
21. Omonov, F. A., & Dehqonov, Q. M. (2022). Electric Cars as the Cars of the Future. Eurasian Journal of Engineering and Technology, 4, 128-133.
22. Omonov, F. A. (2022). Formation and Analysis of Urban Passenger Traffic Control. Eurasian Journal of Research, Development and Innovation, 6, 6-13.
23. Omonov, F. A., & Sotvoldiyev, O. U. (2022). Adaptation of situational management principles for use in automated dispatching processes in public transport. International Journal of Advance Scientific Research, 2(03), 59-66.
24. Maxamat o'g'li, D. Q. (2022). Production Resources of Motor Transport Enterprises Planning and Analysis of the Effectiveness of the Provision of Motor Transport Services Costs of Motor Transport Enterprises. Eurasian Research Bulletin, 8, 48-51.
25. Abduraxmonov, A. O. Sotvoldiyev & Tojiboyev, F. (2021). Korxonada shinalar va harakatlanuvchi tarkibni tahlil qilish va tekshirilayotgan harakat tarkibining xususiyatlari. Academic research in educational sciences, 2(11), 1357-1363.
26. Xusanjonov, A., Qobulov, M., & Ismadiyorov, A. (2021). Avtomobil Shovqiniga Sabab Bo'luvchi Manbalarni Tadqiq Etish. Academic research in educational sciences, 2(3), 634-640.
27. Xusanjonov, A., Qobulov, M., & Abdubannopov, A. (2021). Avtotransport vositalaridagi shovqin so'ndiruvchi moslamalarda ishlatilgan konstruksiyalar tahlili. Academic research in educational sciences, 2(3), 614-620.
28. Qobulov, M. A. O., & Abdurakhimov, A. A. (2021). Analysis of acceleration slip regulation system used in modern cars. ACADEMICIA: An International Multidisciplinary Research Journal, 11(9), 526-531.
29. Khusanjonov, A., Makhhammadjon, Q., & Gholibjon, J. (2020). Opportunities to improve efficiency and other engine performance at low loads. JournalNX, 153-159.
30. Мелиев, X. O., & Қобулов, М. (2021). Сущность и некоторые особенности обработки деталей поверхностно пластическим деформированием. Academic research in educational sciences, 2(3), 755-758.
31. Qobulov, M., Ismadiyorov, A., & Fayzullayev, X. (2022). Analysis of the braking properties of the man cla 16.220 for severe operating conditions. European International Journal of Multidisciplinary Research and Management Studies, 2(03), 52-59.
32. Qobulov, M., Ismadiyorov, A., & Fayzullayev, X. (2022). Overcoming the Shortcomings Arising in the Process of Adapting Cars to the Compressed Gas. Eurasian Research Bulletin, 6, 109-113.
33. F. A. Omonov (2022). The important role of intellectual transport systems in increasing the economic efficiency of



- public transport services. Academic research in educational sciences, 3 (3), 36-40.
34. Hurmamatov, A. M., & Hametov, Z. M. (2020). Results of preparation of oil slime for primary processing. *ACADEMICIA: An International Multidisciplinary Research Journal*, 10(5), 1826-1832.
35. Hurmamatov, A. M., & Hametov, Z. M. (2020). Definitions the division factor at purification of oil slime of mechanical impurity. *ACADEMICIA: An International Multidisciplinary Research Journal*, 10(5), 1818-1822.
36. Xametov, Z., Abdubannopov, A., & Botirov, B. (2021). Yuk avtomobillarini ishlatishda ulardan foydalanish samaradorligini baholash. *Scientific progress*, 2(2), 262-270.
37. Fayziev, P. R., & Khametov, Z. M. (2022). Testing the innovative capacity solar water heater 200 liters. *American Journal Of Applied Science And Technology*, 2(05), 99-105.
38. Siddiqov, B., Abdubannopov, A., & Xametov, Z. (2022). Gaz divigateling termal yukini kamaytirish. *Eurasian Journal of Academic Research*, 2(6), 388-395.
39. Abdusalom o'g'li, J., & Muxtorovich, X. Z. (2022). Yo'l-transport hodisalarini rekonstruksiya qilish va ekspertizadan o'tkazish paytida transport vositalarining tormozlanish jarayonining parametrlarini aniqlash metodikasi. *Pedagogs jurnali*, 10(4), 202-207.
40. Azizjon o'g'li, M. A., & Muxtorovich, X. Z. (2022). Yo'l havfsizligi va uning ta'siri zamonaviy yo'l va transportni rivojlantirish uchun. *Pedagogs jurnali*, 10(4), 208-212.
41. Ergashev, M. I., Abdullaaxatov, E. A., & Xametov, Z. M. (2022). Application of gas cylinder equipment to the system of internal combustion engines in Uzbekistan. *Academic research in educational sciences*, 3(5), 1112-1119.
42. Fayziev, P., Zamir, K., Abduraxmonov, A., & Nuriddin, O. Solar multifunctional dryer for drying agricultural products.
43. H.O. Meliyev. (2022). Influence of soil and climatic conditions on the operation of universal ploughing tractors in agriculture. *International Journal of Advance Scientific Research*, 2(12), 166-174.
44. Qaxramonjon Masodiqov. (2022). Recommendations for handling old car tires and ways to remove them. *International Journal of Advance Scientific Research*, 2(12), 175-182.
45. Fayzullaev Xaydarali. (2022). Analysis of the chemical composition of car tire rubber. *International Journal of Advance Scientific Research*, 2(12), 183-191.
46. Dilshod Tursunov. (2022). The main factors that increase the thermal load of gas engines. *International Journal of Advance Scientific Research*, 2(12), 18-26.
47. Fayziev P.R. (2022). The Innovative Household Solar Oven for Cooking.

48. Eurasian Journal of Engineering and Technology, 11, 187–195. Retrieved from Ergashev M. I. (2022). Analysis of methodological approaches for technical evaluation of the level and quality of garage equipment. Innovative Technologica: Methodical Research Journal, 3(10), 120–126.
49. Khujamqulov Sardor Umidjon Ogli. (2022). Analysis of passenger flow of bus routes of fergana city. International Journal of Advance Scientific Research, 2(10), 32–41.
50. Tursunov D.M. (2022). Technical Diagnostics of Cars to Fulfill Their Status and Basic Rules. Eurasian Journal of Engineering and Technology, 10, 121–123. Retrieved from
51. Maxammadjon Qobulov. (2022). Improving the Management of the Number and Composition of Buses in the City of Fergana. Eurasian Journal of Engineering and Technology, 10, 115–120. Retrieved from
52. Xaydarali Fayzullayev. (2022). Vehicle Motion Model with Wheel Lock. Eurasian Journal of Engineering and Technology, 10, 68–73. Retrieved from
53. O'tkir Sotvodiyev. (2022). A Regional Look at Cars in A Mixed Park. Eurasian Journal of Engineering and Technology, 10, 79–84. Retrieved from
54. Ismadiyorov Asrorjon Anvarjon. (2022). Research on polishing properties of gear oils and ways to improve them. Innovative Technologica: Methodical Research Journal, 3(09), 13–21.
55. Otabayev Nodirjon Ibragimovich. (2022). Mathematical model of diesel internal combustion engine subsystem. Innovative Technologica: Methodical Research Journal, 3(09), 22–28.
56. Masodiqov Q. X. (2022). The study of theoretical and practical aspects of the occurrence of internal stresses in polymeric and paint-and-lacquer materials and coatings based on them, which have a significant impact on their durability. Innovative Technologica: Methodical Research Journal, 3(09), 29–37.
57. Abdurakhimov A. A. (2022). The basics of determining the braking of vehicles in road traffic. Innovative Technologica: Methodical Research Journal, 3(09), 63–78.
58. Tursunov D. M. (2022). Study of the stages of development of a gas-cylinder engine supply system. Innovative Technologica: Methodical Research Journal, 3(09), 79–87.