

## CONTROL OF THE TEMPERATURE OF THE REFRIGERATOR IN AN AUTOMATIC CONTROL SYSTEM

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### ABSTRACT

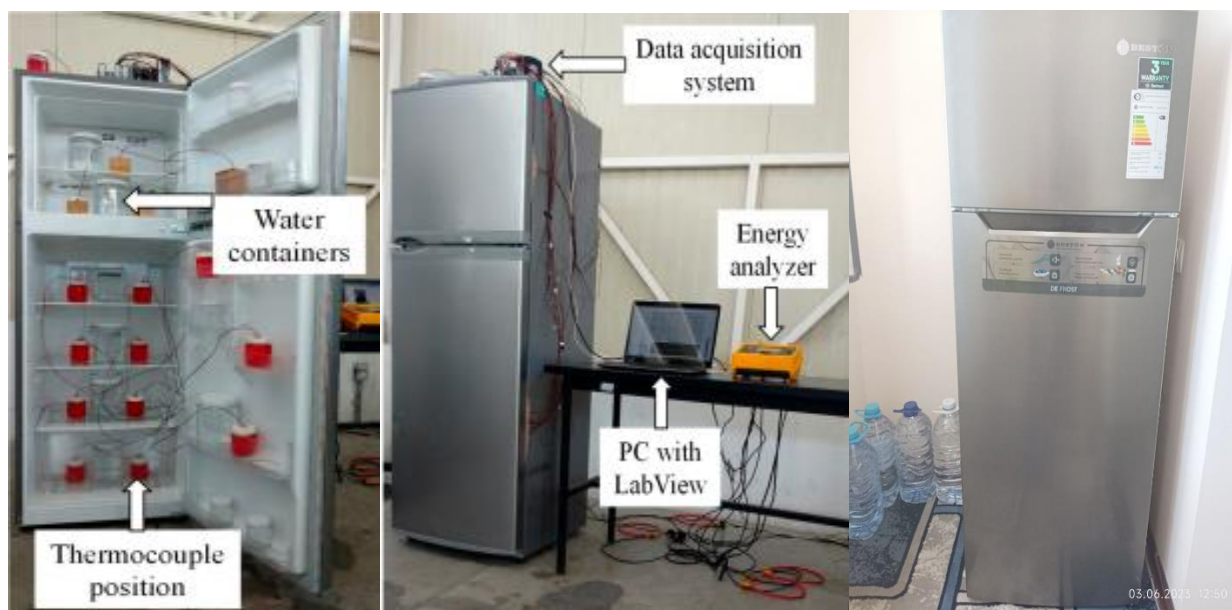
This study was conducted by Otelbayev Azizbek, a student of the Nukus Mining Institute. thermal load on volume (food) and further elucidated by experimental evaluation the main effect of temperature variability. Azizbek carried out the experiment in the Beston freezer. For conducting experiments, the thermal load volume and absolute temperature were classified according to the following. Based on the results of a survey conducted among various consumers in the industrial sectors of the Republic of Karakalpakstan, suggestions and appeals for automatic temperature control of refrigerators were considered. Thermal behavior of both refrigerator compartments, total energy consumption, capacity in the first operating state of the compressor and according to the classification of the coefficient of performance cases related to thermal loads volume and room temperature were considered. Finally, the thermal load volume temperature was checked and room temperature has been proven in our research to have a significant effect on the energy efficiency of the refrigerator. Our main goal was to review the control of automatic temperature control of refrigerators.

**Keywords:** Temperature control, energy consumption, thermal load capacity, household cooling system, automatic control of the cooling system.

### INTRODUCTION

The main purpose of a household refrigerator is to store food products. Most of these refrigerators are based on technology and high energy consumption for their continuous operation has been proven in our research. Meanwhile automatic control of the cooling system (including air conditioning) consumes 19% of total electricity. About 70 percent of households in the Republic of Karakalpakstan have at least one refrigerator. According to the Electricity Saving Trust, a refrigerator accounts for approximately 25% of total energy consumption. in the Republic of Uzbekistan the refrigeration industry has seen rapid development over several decades, this also leads to a significant increase in energy consumption. So that's it for the gear research work on energy improvement and energy consumption reduction has begun. Studies have shown that energy conservation regulations are guaranteed to some extent. Thus, Beston provides a guide to the study of the various mechanisms that can multiply the refrigerator and energy efficiency, such as the design of the main components, thermal insulation, adequate heat quantity and use of alternative refrigerants etc. are examples. However, the energy of refrigerators consumption depends not only on the technical characteristics of the components, but also depending on the consumer's usage habits and the environmental conditions in which the device is located it will be necessary to deliver the amount of energy as shown. Based on the above information, different cases depend on the usage habits of users the cold system is becoming more important in the chain and in the proper storage of food. Among these factors, the following can be noted: the frequency of opening doors to room temperature, the position of

the thermostat, examples of reasons include the amount of food and cleaning in the case of external condensers. In the literature, there are works on the study of these factors in the technological system. For example, experimentally assessed room temperature and other factors such as opening doors and the status of the thermostat, based on the results of studies on the energy consumption of the refrigerator. O'telbayev Azizbek concluded during the research, the temperature of the room affects the energy consumption more, and then the opening of the doors also affects the temperature. The article analyzed household energy consumption and the refrigerant is affected by various factors, e.g. based on theories about the position of the thermostat and the room temperature. The authors found that all factors affect energy. Later, the authors expanded their research and analyzed factors such as thermostat status, thermal load, and ambient temperature, experiments on the heat transfer and energy consumption of the refrigerator were conducted in closed buildings. The authors concluded that the largest contributions occurred with the increase in energy when the heat load varied from 0 to 15 kg. consumption is 50% and when the ambient temperature changes from 15 °C to 25°C, 30% growth was considered similar to previous studies. Increase energy consumption by up to 20%, increase depending on the frequency of energy consumption increased by 25% when the ambient temperature changed from 15 °C to 30 °C and by 50% when the temperature increased. If the mechanization of the temperature automatic cooling system is produced, the processes of controlling the cooling control in the system are perfectly implemented. In the literature used, technological automation system as well as research based on the automation approach in a statistical system based on a series of surveys and cases related to consumer usage habits are reflected. For example, compliance with temperature, cleanliness and storage rules, where food is stored inside refrigerators. According to the author, about half of the refrigerators considered in the survey are faulty causing malfunctions in food storage practices. In addition, the internal temperature of the refrigerator is taken into account and should be higher than the recommended temperature for this appliance. Azizbek evaluated the behavior of the consumer in connection with the use of the refrigerator. They analyzed ambient temperature conditions, the internal temperature of the chamber and the heat sources near the refrigerator depend on it affects the heat and energy performance of household appliances. Based on the results, the authors make a number of recommendations for energy efficiency and conclude that there is a shortage. The information provided to consumers on this topic has been widely discussed. Later, the authors expanded their research and that's its experimental evaluation of some operational factors that reflect the daily use of refrigerators, such as thermal load affected by the ambient temperature, the position and quantity of the thermostat food storage was concluded. They concluded that energy consumption is very sensitive to ambient temperature and to a lesser extent, the internal temperature of the refrigerator and the thermal load have been proven to depend on the volume. We have reviewed various works that have analyzed similar factors.



Picture 1. Experimental test studies in a closed building: temperature distribution and monitoring of temperature changes in automatic control.

## DISCUSSION

In this paper, the main results from the thermal behavior of both compartments refrigeration is also shown to reduce energy consumption for different conditions of heat studies were performed on load volume and room temperature. In order to increase reliability, the results of each test were performed in triplicate. Refrigerator were compared with the results representing the mean value of the temperature and energy measurements. Besides, the results presented are based on results obtained when thermal temperature stability is achieved in both sections. In this article, the temperature control mode when the average temperature in both chambers of a household refrigerator is equal to the average temperature in both chambers of a household refrigerator with knowledge based on refrigerator usage habits, energy consumption and requests. cooling system with different thermal loads was considered. In addition, the effect of room temperature on the operation of the refrigerator was analyzed, so that the article serves as a basis for a deeper analysis and better understanding of the refrigerator's energy consumption. This type of refrigerator research should facilitate recommendations through the manufacturer, about how to make better use of the device in terms of energy and heat about what consumption habits lead to large increases in food and energy consumption in general may reduce the quality of food due to incorrect temperature in its compartments. In addition, this study was presented to consumers and producers as a reinforcement of information, understands how refrigerator usage habits affect thermal conditions and energy consumption. Thus, recommendations on the use of the refrigerator were given.





Picture 2. Indicators of electrical energy efficiency of the refrigerator

## CONCLUSIONS

In this article, research work was carried out to reduce energy consumption and ensure proper operation of the refrigerator based on the parameters of the refrigerators. In the results of the research, a typical refrigerator of 0.5 m<sup>3</sup> was used to achieve reliability, results were analyzed in triplicate for each assay. The following indicators were reviewed and updated as key comments in the analysis results. Research has shown that the amount of food typically stored in refrigerators depends on the cooling system. Thus, the volume of different thermal loads (minimum load from 5 kg to maximum 25 kg) in this study the results were compared. The heat movement in both chambers of the refrigerator was in no way consistent and the condition of constant temperature with respect to thermal load increase while maintaining a constant room temperature was considered. Energy consumption was observed to be greatly affected due to increased heat load. Here, for example, for an ambient condition of 25 °C, it rises from 0.7 kW / h. Observed up to 4.5 kWh (25 kg). These results ranged from an increase of 0.7 kWh (0 kg) to 5.5 kWh (30 kg). temperature was 25 °C. The first position of the compressor increased when the heat load increased. It is reflected in the total energy consumption of the refrigerator, and the energy consumption decreased by 15%. Finally, it was clearly observed that the energy consumption of the refrigerator continuously increased, the effects of thermal load and room temperature increase were studied.

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