

## **An Experimental Investigation of the Effect of Control Algorithm on the Energy Consumption and Temperature Distribution of a Household Refrigerator**

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**Abstract :** In order to determine the energy consumption level and cooling characteristics of a domestic refrigerator controlled with various cooling system algorithms, a side by side type (SBS) refrigerator was tested in temperature and humidity controlled chamber conditions. Two different control algorithms; so-called drop-in and frequency controlled variable capacity compressor algorithms, were tested on the same refrigerator. Refrigerator cooling characteristics were investigated for both cases and results were compared with each other. The most important comparison parameters between the two algorithms were taken as; temperature distribution, energy consumption, evaporation and condensation temperatures, and refrigerator run times. Standard energy consumption tests were carried out on the same appliance and resulted in almost the same energy consumption levels, with a difference of %1,5. By using these two different control algorithms, the power consumptions character/profile of the refrigerator was found to be similar. By following the associated energy measurement standard, the temperature values of the test packages were measured to be slightly higher for the frequency controlled algorithm compared to the drop-in algorithm. This paper contains the details of this experimental study conducted with different cooling control algorithms and compares the findings based on the same standard conditions.

**Keywords :** control algorithm, cooling, energy consumption, refrigerator

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