PRELIMINARY TESTS REGARDING THE OPERATING CONDITIONS AND MODELING OF THE ENERGY CONSUMPTION FOR A DOMESTIC REFRIGERATOR

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Abstract

Energy saving and resources and environment preservation are key factors for the sustainable development of our society and hence domestic appliances are also targeted for energy efficiency improvements. Because refrigerators are the largest energy consuming appliances in households due to their widespread use and continuous operation there is a need for rigorous investigations regarding the energy consumption and efficiency of these devices. In the present paper the results of experimental tests are presented; in order to predict the energy consumption of the appliance in different operating conditions (ambient temperature, load and door openings) a simplified model was developed, based on the experimental data. A statistical analysis of the model was then performed in order to evaluate the goodness-of-fit between the model and the experimental data. The tests were performed in different days (starting at 7 a.m. each day) between may, 2015, and september, 2015. As the aim was to obtain results for two different ambient temperatures (25^0C and 30^0C) there was a selection of the results in order to achieve this goal; for the selected tests the actual mean environmental temperatures were: 25.08^0C and 30.04^0C respectively. The Multi linear regression method was used in order to develop the energy consumption model. The results confirmed that refrigerator load and ambient temperature have a significant effect on the energy consumption, when there was no door opening during the test period; when door openings were taken into account the significance of the above-mentioned factors was diminished.

Key words: energy consumption, multi linear regression, significance