

Thesis Title	Number of Air Change for Commercial Refrigerator
Thesis Credits	6
Candidate	Mr. Sukum Tantisripreecha
Supervisors	Professor Dr. Tanongkiat Kiatsiriroat Dr. Jirawan Tiansuwan
Degree of Study	Master of Science
Department	Thermal Technology
Academic Year	1999

Abstract

A significant feature of refrigerating system design for an efficient commercial refrigerator is to control air input. This uncontrolled air which flows into a refrigerator will become cooling load to the system.

Since commercial refrigerators operating is opened and closed very often, there must be some considerations about cooling load from air input while designing refrigerating system and sizes of refrigerators to be appropriated to the real operation. The data of air input per second or, 'Number of Air Change' will be discussed.

This research is a study of number of air change and amount of energy used in a 35 ft³ vertical, refrigerator R-12 refrigerant. The test was separated into 2 cases, no-loaded and loaded. Both cases were tested at the temperature set of -5, -10, -15 °C and the time used for opening and closing the refrigerator door of 30, 60, 120, 180 seconds. The results were as follows:

Number of Air Change: Case of No-loaded Refrigerator

Time	Number of Air Change		
	Temperature-5	Temperature-10	Temperature-15
30	2.98-3.02	3.7-3.86	4.45-4.77
60	4.34-4.72	5.82-6.08	7.03-7.21
120	7.28-7.48	8.69-9.00	9.98-10.34
180	9.45-9.77	11.03-11.81	12.58-12.88

Number of Air Change: Case of Loaded Refrigerator

	Number of Air Change		
Time	Temperature -5	Temperature -10	Temperature -15
30	4.31-4.71	5.76-6.18	7.11-7.38
60	7.46-7.72	10.00-10.32	12.03-12.10
120	11.27-11.56	14.22-15.01	17.58-17.92
180	15.72-16.03	19.53-19.53	24.21-24.6

The number of air change and the amount of energy used of the loaded case was higher than the other one. However, in both cases, the number of air change and the amount of energy used would increase relevantly to the periods of opening and closing time and also the difference value of the temperature between outside and inside. Increase of the number of air change results in increase of the energy consumption.

Keywords: Number of Air Change / cooling load / commercial refrigerator