

**ID: 2016-ISFT-427**

# A Study of Refrigerator Performance by a Change of Superheat

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**Abstract:** According to recent rapid progress development of electrical and electronics industry, the studies of steady state operating refrigeration system that is using inverter with variable capacity of fan and compressor or electronic expansion valve are increasing. Though these equipments, system can achieve high efficiency and comfortability as well as distribute saving energy operating by system automation. In this study, analysis the COP (Coefficient of Performance) through controlling expansion valve manually also we can verify a refrigeration theory according to change of evaporator pressure.

**Keywords:** refrigeration, expansion valve, COP (Coefficient of Performance)

## 1. INTRODUCTION

Recently, as the electronics industry has improved, inverter which is available to change the fan capacity of compressor

in refrigeration system, and the research of steady state which used electronic expansion valve is increasing.

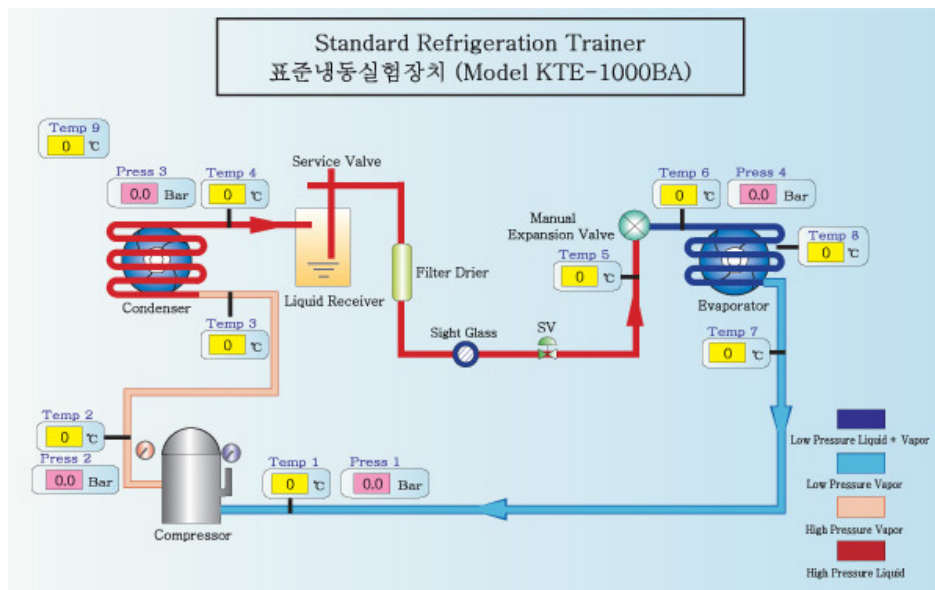
Such as devices have appeared in the system, contribute to energy-saving operation of the automated system, as well as improve the high efficiency and comfort.

The purpose of this study is the circuit according to the load on the evaporator, and to study the COP of changes in the standard refrigeration cycle [1-2].

In addition, any changes in the standard refrigeration cycle according to the evaporator pressure changes and want to study COP.

## 2. DESCRIPTION OF EFU (EQUIPMENT OF FAN FILTER UNIT)

Fig 1 is a schematic diagram of a refrigeration system. And Table 1 shows the specifications of the refrigeration system used in the experiment.



**Fig. 1. Standard Refrigeration Trainer**

**TABLE 1: Specification of Refrigeration equipment**

Compressor	1/3 hp	single 220 V	R-22
Condenser	2/3 hp	single 220 V	Air cooling
Expansion valve	Manual type	-	-
Evaporator	1/2 hp	single 220 V	Air cooling

Such as this equipment was analyzed change in the heat capacity and COP to change overheating. Table 2 shows the results of COP and the heat capacity.

**TABLE 2: The results of COP and the heat capacity**

Division	Eva-Temp.(°C)	Con-Temp.(°C)	Sub cooling.(°C)	Super heating.(°C)
1	-15.5	29.1	0	0
2	-15.7	30.7	0.9	8.08
3	-15.7	31.8	0.9	12.10
Division	Qe (Kcal/kg)	Qc (Kcal/kg)	W (Kcal/kg)	COP
1	164.69	202.02	37.33	4.41
2	169.08	209.30	40.22	4.20
3	171.77	212.75	40.98	4.19

### 3. CONCLUSIONS

The change in evaporation temperature caused by an evaporator load difference is tested to determine the effect of the cycle. Therefore, the remaining other than the evaporation temperature and the compressor inlet temperature is the result obtained by the experiment under the same conditions. The results of experiment is increased refrigeration effect and compressed work as overheating increases. Because increasing of compressed work is bigger than refrigeration effect, COP decreased.

### REFERENCES

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