



RS-44 COMMERCIAL WALK-IN COOLER TRIAL

Tests were carried out on a walk in cooler the test site of Refrigerant Services Inc in Dartmouth, Halifax, Canada between August 2000 & October 2001 in which R22 was replaced by RS-44. The existing mineral oil in the system was retained for use with RS-44 and no changes were made to the hardware

SYSTEM SPECIFICATIONS

1 HP air-cooled walk-in cooler (field assembled)
Size: 3m x 2m x 2m high
Design temperature: + 2^oC
Condensing unit manufacturer: Danfoss
Model no: DS100H2ADD Serial no: 050102240
Capacity: 9000 BTU @ -5C SST, 40C CT
Type: air defrost
Voltage 208/220/3/60
Compressor type: semi-hermetic
Evaporator manufacturer: Cancoil
Model no: ALP0910 serial no: 0539405U
Capacity: 9000 BTU @ 5C TD
Oil type: mineral oil
Expansion device: TXV
Operating refrigerant charge: 1.59 kg R22
Number of months in service: 26
Suction line length: 4 meters

MODIFICATIONS TO SYSTEM:

No modifications were made to the system.

STAGE 1 OF COMMERCIAL WALK-IN COOLER TRIAL PROCEDURE

The system was operated for several hours with the original R22 charge. Baseline data was recorded including :

Voltage, amperage, suction pressure, suction temperature, discharge pressure, discharge temperature, liquid line temperature, ambient temperature, space temperature, oil level and compressor run time.

STAGE 2 OF COMMERCIAL WALK-IN COOLER TRIAL PROCEDURE

The R22 charge was recovered and the system evacuated. an equal amount by weight of RS-44 was charged into the system and the system was operated. Additional amounts of RS-44 were added to the system until the liquid line sight-glass indicated a full charge. the same data as stage 1 was collected for comparison purposes.

	RECORDED DATA	
	R-22	RS-44
Refrigerant charge	1.59 kg	2.13 kg
Additional refrigerant required		0.54 kg
Suction pressure range	2.28-2.9	2.07-2.97
Suction temperature	16	13.4
Discharge pressure range	13.24-14.48	14.0-14.48
Discharge temperature	85	71
Liquid line temperature	36	40
Ambient temperature	22	25
Amperage	4.17	3.75
Voltage	209	208
Space temperature	2	2
Run time per hour	42	N/A

Pressures are in bars gauge

Temperatures are Celsius.

All readings are averages over several hours of operation.

GENERAL OBSERVATIONS:

- (1) Suction and discharge pressure ranges using RS-44 were similar to those using R22.
- (2) Discharge temperature was 15% lower with RS-44.
- (3) Energy usage was slightly lower with RS-44 and no measurable change in performance or capacity.
- (4) Oil return was satisfactory.

CONCLUSIONS:

- (1) After conversion, equal or slightly better operational performance was achieved with no modifications to the system.
- (2) Significantly lower discharge temperatures after conversion could improve compressor reliability and extend compressor life especially during high ambient temperature.
- (3) There appeared to be improved energy efficiency using RS-44.