



RS-50 (R442A)

REPLACES R404A AT S K FOODS MIDDLESBROUGH



Blast chiller operating on RS-50 (R442A) which shows an increased energy efficiency of 22% and a higher capacity of 14% compared to R404A.

S K Foods Ltd, a food manufacturer and a leader in the world of chilled snack food and ready meals, made a major capital investment in 2010 at the company's largest manufacturing site in Middlesbrough. This development was completed in 2012 doubling the capacity of the plant and included a range of new refrigeration equipment essential to the manufacturing process. The company decided that they would not use the refrigerant R404A due to its high direct Global Warming Potential (GWP) and were looking for an alternative product which would not only have a lower global warming potential but also a greater energy efficiency.

Paul Jackson, Senior Engineering Manager, approached Refrigerant Solutions Ltd (RSL) to test out the new refrigerant RS-50 (R442A) which is non flammable, more efficient and less than half the GWP of R404A. RS-50 is additionally an effective Drop-in replacement for R404A since little if any changes are required to the existing equipment to use this new refrigerant. The deployment of RS-50 is entirely consistent with the policy of S K Foods which is to reduce their carbon footprint and minimising any effect on the environment.

Conversions of a blast chiller, cold store and freezer were carried out during 2012 with RS-50 replacing R404A and R507. Evaporating temperatures ranged from -8°C to -38°C. All installations are operating satisfactorily & there have been no problems using RS-50 which is performing well.

Retrofitting R404A with RS-50 proved to be straightforward. The systems were operating under standard operating conditions before R404A was replaced by RS-50. No change of lubricant was required since the systems already contained POE oil with which RS-50 is fully miscible. Because RS-50 has a lower liquid flow rate than R404A, the expansion device was adjusted accordingly which was the only change needed during the retrofit procedure.

from

REFRIGERANT SOLUTIONS LIMITED

The Refrigerant Specialists

RS-50 has been operating successfully at this site since May 2012. Two blast chillers operating side by side with one operating on R404A and the other on RS-50 showed the following results:

Direct comparison between identical systems					
System 2A & 2B (R404A) and System 3A & 3B (R442A)					
		2A	3A	2B	3B
1	Refrigerant Type	R-404A	RS-50	R-404A	RS-50
2	Date	19/02/2013	19/02/2013	19/02/2013	19/02/2013
3	Time	14.00	15.00	16.00	17.00
4	Suction Pressure (psig)	42 psig	39 psig	40 psig	37 psig
5	Discharge Pressure (psig)	220 psig	220 psig	225 psig	220 psig
6	Cooling Capacity (btu)	62.0	70.9	62.0	70.9
7	Compressor amperage	42.5A	39.9A	43.5A	40.5A
8	Energy Consumption (watts)	24277.5	23032.5	24277.5	23032.5
9	COP	3.51	4.28	3.43	4.22
10	Evap entering temperature	+4°C	+4°C	+4°C	+4°C
11	Evap leaving temperature	-3°C	-4°C	-3°C	-4°C
15	Evaporator Superheat C	8°C	6°C	8°C	7°C
16	Discharge Temperature C	66°C	64.5°C	67.5°C	62°C
17	Suction Temperature C	-6°C	-4°C	-7°C	-5°C
18	TXV setting (turns open)	22MM	N/K	22MM	N/K
19	Oil Level	CORRECT	CORRECT	CORRECT	CORRECT
20	Refrigerant Charge (kg)	80 kgs	N/K	80 kgs	N/K
21	Compressor consumption (watts)	17637.5	16558.5	18052.5	16807.5

Section #8 is energy consumption for entire unit
 Section #21 is energy consumption for compressor only
 Evaporators FRIGA BOHN 2x6DB3L rated @ 44.62 kW @ 7°C
 Evaporator air volume = 25200 3hr @ 1000 RPM

Compressor used is a Copeland 6 cylinder semi hermetic reciprocating type.

These results show that the energy efficiency and cooling capacity of RS-50 are 22% and 14% respectively greater than R404A, which supports the extensive trials carried out on RS-50 by the Technical University of Barcelona.

Paul Jackson of S K Foods said: "Investment in this new production facility is an important part of our overall strategy to deliver high quality products and a good service to our customers. It is also important and company policy to be aware of and minimise any effect on the environment. R404A is well known and the dominant low temperature refrigerant used in the industry today, but it does have a high direct GWP so that we were anxious to explore the possibility of using an alternative refrigerant which has a lower GWP and higher energy efficiency. RSL explained that RS-50 is just such a refrigerant and so it has proved. The conversion process was simple and the results have been impressive as demonstrated by the initial results shown above. Our plan is to convert the remaining systems in the factory to RS-50."



REFRIGERANT SOLUTIONS LIMITED

8 MURIESTON ROAD, HALE, ALTRINCHAM, CHESHIRE WA15 9ST
 Tel: (+44) (0)161 926 9876 Fax: (+44) (0)161 926 9875 Email: rs@refsols.com Web: www.refsols.com