Conversion of Refrigerant Plants to RS-50

RS-50 (R-442A) refrigerant is compliant with the new European regulations due to its low global warming potential (GWP). At a GWP of 1888, RS-50 is less than 50% compared to R-404A and R-507. Additional advantages when compared to R-507, R-404A and the other HFC solutions currently on the market are:

- **RS-50 has up to 30% higher cooling capacity compared to R404a**
- **RS-50 offers a much better coefficient of performance (COP) at low temperatures**
- **The heat exchangers have better heat transfer, reducing the operating time**
- **of the compressors**
- **Energy savings from RS-50 lead to quick return of investment**
- **Current system owners have already seen energy savings of approximately 25%**

The systems that were originally designed for or converted to the refrigerants R-404A, R-507, R-407F, R-407A, can easily be replaced by RS-50, with no important modifications necessary. This is a “drop-in” direct conversion, without changing the type of oil or any of the main components. The only modifications necessary are:

- **Adapting the temperature of the set points to RS-50**
- **Changing the aperture of the expanson valves, due to mass flow of RS-50 being 40% lower than R404A**

Energy savings from RS-50 lead to quick return on investment

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Actual Case Performances

Company	Country	Gas Type	Compressor	COP	Saving Energy (%)	Energy Consumption (KW)	R. Charge (Kg)	Cooling Capacity (KW)	Oil
S K Foods Ltd	UK	R-404A	Copeland 6 cylinder semi hermetic reciprocating type	3.51	22	24.28	80		POE
		RS-50		4.28		23.03	N/K		
Conclusions & Observations	The energy efficiency and cooling capacity of RS-50 are 22% and 14% respectively greater than R404A. No change of lubricant oil. The only modification needed was to slightly close the expansion valves.								
Sorli Discau	Spain	R-507	4 Bitzer Compressors	See Below	25		200		POE SUNISO SL-32 (ISO-32)
		RS-50					200		
Conclusions & Observations	RS-50 provides more cooling capacity in a shorter time, therefore the compressor runs less time. No change of lubricant oil. The only modification was to slightly close the expansion valves. System was designed for R507.								
Aqua Production Systems	Canada	R-404A	Copeland 4DJ3R28ME-TSE	3.64	24				POE
		RS-50		4.51					
Conclusions & Observations	The capacity of the compressor when using the two gases did not change significantly but COP increased 24%.								
Auchan Meriadeck	France	R-404A	5 BITZER semi hermeti		30	2067	500		POE (EAL22CC)
		RS-50				565	500		
Conclusions & Observations	Using RS-50 instead of R-404A provided estimated energy savings of 30%. No change of lubricant oil. The only modification needed was to slightly close the expansion valves.								
Mc Vite	UK	R-22	Bitzer 4T-12.2		16	19.15	11.2		Mineral Oil
		RS-50				16	8		POE Mobil EAL Arctic 68
Conclusions & Observations	The performance with RS-50 provided an average power saving of 16% over R22.								
8 à Huit	France	R-404A	2 x Bitzer4 FC 3.2 Y-40S		See Below		Same as R-404A		POE
		RS-50							POE
Conclusions & Observations	RS-50 provided gains in energy efficiency between 20 and 30% compared to R404A. No change of lubricant oil. Mass flow of RS-50 is 40% lower than R404A, leading to closing expansion valves slightly and changing their apertures.								
Refriapp	Spain	R-507	Refcomp SP-6L270E	1.87	23	15.9		30.3	POE
		R-407F		2.18	5.5	14.6		31.3	POE
		R-407A		2.04	13	14.9		31.3	POE
		RS-50		2.30		15.7		36	POE
Conclusions & Observations	RS-50 has the highest COP and cooling capacity, for these reasons it was selected to replace R-507 in front of other refrigerants.								
Frigoríficos Ferrer S.A.	Spain	R-404A	2 BITZER HSN7461-70 (Y)				Same as R-404A		POE
		RS-50							
Conclusions & Observations	RS-50 provided an estimated 30% increase in cooling capacity. Modifications were made to temperature set points. Mass flow of RS-50 is 40% lower than R404A, leading to closing expansion valves slightly and changing their apertures.								