

R407F (Performax LT) Installation

IGA X-press East Campbelltown, Sydney

CASE STUDY



Application:

New build for a small supermarket requiring both low and medium temperature showcases with consideration given to ongoing running costs and energy efficiency. R407F chosen as low temperature solution due to lower global warming potential (GWP) than R404A.

R404A GWP 3922 vs R407F GWP 1825

Scope:

Medium temperature

- The medium temperature 15hp compressor receiver set uses the well proven R134a refrigerant, providing 22kw/r at -10sst. This is coupled to a Guntner GVH 050.1A/2-NDE condenser.

Low temperature

- The low temperature 15hp compressor receiver set uses the relatively new R407F refrigerant, providing 13kw/r at -30sst. This is coupled to a Guntner GVH 050.1A/2 condenser. Units are placed in the basement below the store, and remote Guntner condensers are located on the roof of the store.

Both medium and low temperature compressors are driven by VSD with an Einstein CPC control system.

Install & Commissioning:

- Ultra Refrigeration followed the guidelines for the use of R407F, particularly the liquid phase charging instructions which were strictly adhered to.
- Meticulous attention to superheat settings formed a crucial part of the commissioning process, with typical superheat settings of 5-6K ensuring that return gas temperatures remain at approximately -15°C and discharge temperatures remain within acceptable limits.
- Only a head cooling fan was installed and runs at any time that the compressor runs.

Contractor Feedback:

Ultra Refrigeration is very happy with all aspects of the installation.

“We set the system up and have never had to go back except for normal servicing, a great result! With proven energy efficiency and future proofing built in for the customer.”



Refrigerant R407F

Main physic-chemical properties:

- Boiling point at 1.013 bar = -46.06°C
- Temperature glide at 1.013 bar = 6.4° K
- Critical temperature +82.66°C
- Flammability in air, non-flammable
- NF-EN378 classification L1(A1/A1)
- Potential for action on ozone (R-11=1):0
- GWP(CO2=1): 1825

	R22	R407A	R404A	R422D	R407F
Capacity kJ/m3	1005	949	984	778	1020
OOP	0.05	0	0	0	0
GWP	1810	2107	3922	2729	1825

Retrofitting R407F

R407F is not a drop-in refrigerant.

It can be successfully used as a retrofit refrigerant, however the following system modifications must be undertaken:

TO REPLACE R22:

1. Record existing system performance data.
2. Run each circuit through a defrost to optimise oil return.
3. Recover R22 to storage cylinder, record quantity.
4. Choose appropriate lubricant for compressor application.
5. Drain existing lubricants from compressors, separators & oil reservoirs – record quantity removed.
6. Change any oil filters if present.
7. Recharge system with synthetic oil, match quantity to what was removed.
8. Recharge R22 into system, run for 24 hours to recover as much residual mineral oil as possible (maximum 5% residual oil).
9. Replace all elastomeric seals, filter driers & suction filters.
10. Leak test system.
11. Recover R22 & evacuate system.
12. Liquid charge with R407F.
13. Check expansion valve – generally no change required.
14. Check system operation. Expect generally higher discharge pressure & temperature.
15. Optimise refrigerant charge – should not exceed 95% of charge removed.
16. Label system with details of refrigerant & lubricant used.
17. Monitor system with particular attention to lubrication cleanliness.

TO REPLACE R404A/R507

1. Record existing system performance data.
2. Recover R404A/R507 to storage cylinder, record quantity.
3. Choose appropriate lubricant for compressor application.
4. Drain existing lubricants from compressors, separators & oil reservoirs – record quantity removed.
5. Change any oil filters if present.
6. Recharge compressor with polyol ester oil, match quantity to what was removed.
7. Replace all filter driers & suction filters.
8. Evacuate the system.
9. Leak test system.
10. Liquid charge with R407F.
11. Check expansion valve – generally no change required.
12. Check system operation. Expect slightly higher discharge pressure & temperature.
13. Label system with details of refrigerant & lubricant used.
14. Monitor system with particular attention to lubrication cleanliness.



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