

## R434A (RS-45) SIMPLIFIES RETROFITS

### RETROFIT CASE STUDY

GAS SERVEI S.A. would like to thank INDUSTRIAL LERIDANA DEL FRIO S.L. (ILERFRED) for their confidence in this product. This contractor company has always had great interest in developing the best environmentally solutions possible for their customers' systems.



Location: FRUTAS RONCAL-LANA in Épila (ZARAGOZA)  
Contractor company: INDUSTRIAL LERIDANA DEL FRÍO S.L.  
Date: January of 2010

#### INSTALLATION

- Equipment: 4 Compressors
  - 1 BOCK Type F16/2051
  - 2 COPELAND Type 4 CC 75
  - 1 BITZER Type 6F.2
- Original refrigerant: R22
- Original oil: Shell Clavus G-68  
5 l per compressor
- Age of the installation: year 1992
- R22 original weight: 550 kg
- \* Evaporating temperature: Winter: -9°C to -7°C  
Summer: -10°C to -12°C
- Expansion valves: TX12 Y TX20
- Filter drier: DANFOSS
- Oil filter: AC&R
- Evaporating condensers
- Defrosting: By water and hot gas.



The installation is monitored and computed with temperature probes, pressure, humidity and electric consumption control of the compressors.





**RETROFIT SEQUENCE**

08:00 h. Starts the recovering process of HCFC R22 through one ROF 50 recovery machine and another one designed by ILERFRED to 61l recovery cylinders of Gas-Servei S.A.

10:00 h. Recovery process finished with a total amount of 490 kg of HCFC R22. Residual pressure left of 1 bar due to the good compatibility of R434A (RS-45) with HCFC R22.

11:00 h. The compressors are isolated and all the original installation oil is being changed for the same type mineral oil, Shell Clavus G-68. The filter driers and seals are being changed too.

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An amount of 550 kg of HFC R434A (RS-45) is charged. The amount is larger than the recovered R22 due to a previous leak. Adjust the expansion valve and check the oil level.

After three hours a leak appears in one compressor seal (neoprene). Check the seals of the installation and tighten sealing glands, and change some that are made of rubber for others that are suitable for HFCs like Teflon, klingerit, HNBR.

Optimize the refrigerant charge and leave the installation running.

The next day a drop in the oil level was detected in the crankcase of the compressor. Checked that the oil was not located in the cold parts of the installation areas (evaporators), but was found to be distributed throughout the installation. Because of this, ILERFRED decides to change the oil separator for a more efficient one, and achieves the normal levels.

**CONCLUSIÓN**

Alter a complete winter and summer season, this installation was running perfectly. A decrease in energy consumption was found due to the excellent COP of R434A (RS-45). After these excellent results, it was decided to recommend this solution to their customers.

**ADVANTAGES OVER OTHER ALTERNATIVES:  
(SPEED, EFFICIENCY, LOWER INVESTMENT)**

- Due to the working pressures of R434A which are less than 24 bar, it was not necessary to change the safety valves and other parts calibrated to 24 bar, as would have been necessary when changing to R404A, R507, R422A or R428A.
- Owing to the fact that R434A is compatible with mineral oil, these systems using mineral oil did not require changing to a POE oil, as would have occurred with R404A, R507, R407C or R427A thereby reducing the conversion time, oil cost, appearance of new leaks and use of very hygroscopic oils.
- R434A does not have any loss of cooling power compared to R22, which would occur with R422D, R417A, R424A, R407C or R427A.
- Due to its low temperature glide of 1.5°C, in the case of leakage RS-45 can be directly replaced without the need to extract the remaining refrigerant because of the fractionation of the blend as would be necessary with R407C and R427A.
- Owing to the good condensation obtained, it has not been necessary to change the condensers or make any change in this regard as would occur with R404A and R507.
- The owner can continue to use this A1 safety group product, thereby avoiding the use of toxic products such as ammonia which, among other things, also requires a major overhaul of their installations.



**Note:** Information provided by Gas-Servei S.A. [www.gas-servei.com](http://www.gas-servei.com)

**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](mailto:rs@refsols.com) Web: [www.refsols.com](http://www.refsols.com)