

The new high-efficiency refrigerant with low GWP: RS-50 (R442A)

**CASE STUDY OF A SYSTEM WITH RS-50 (R442A) IN A SUPERMARKET
UNDERTAKEN BY FRIGORÍFICOS DEL PENEDEÈS S.A.**



GAS SERVEI S.A. would like to thank the owners of the supermarket **SORLI DISCAU** and the installation company **FRIGORÍFICOS DEL PENEDEÈS S.A.** for their invaluable cooperation in installing the new refrigerant gases with low global warming potential (GWP) and high energy efficiency. This supermarket has always demonstrated a keen interest in adopting the most environmentally-friendly solutions.

Location: Sant Vicenç de Montalt (Barcelona).

Installation company: Frigoríficos del Penedès S.A.

Date: Official opening ceremony on 26 April by Felip Puig, Minister for Enterprise and Employment of the Catalan Government.

SYSTEM SPECIFICATIONS

The system has an automated DANFLOSS cold store with remote control, frequency converters and capacity regulators.

Compressors: 4 BITZER compressors semi-hermetic:

- 1 x 2HP for freezing. MODEL 2DC-2.2Y-40S; 1.9 kW.
- 2 x 25HP for commercial chilling. MODEL 4H-25.2Y; 80 kW.
- 1 x 30HP for climatization. MODEL 4G30.2; 66 kW.



Condenser: LU-VE.

Evaporators: ECO.

Expansion valves: DANFOSS type TES2.

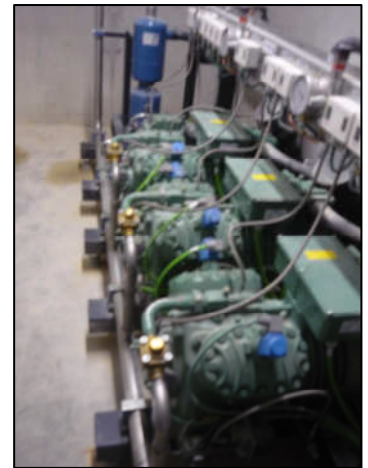
Area to be air-conditioned: 870 m².

Condensation and evaporation float and the heat from the condensation is used for climate control in the store.

Refrigerant Load: 200 kg R-442 (RS-50).

Oil: POE SUNISO SL-32 (ISO-32).

Installation date: 2013.



The system was originally designed for the refrigerant R-507 and in the end the only modification made for using R-442A (RS-50) was to slightly close the expansion valves due to its molecular structure being smaller than that of R-404A/R-507.



AUTOMATED FEATURES AND REMOTE CONTROL OF THE SYSTEM



We can see through the compressor's viewers that the oil level is correct and has not changed, meaning that it offers a good return due to the composition of the R-442A (RS-50).



Data taken on 26/11/2013

| | Frozen | Fresh |
|-------------------------------|--------|-------|
| Room Temperature (°C): | - 20 | 3 |
| Evaporating temperature (°C): | - 33 | -12 |
| Condensing temperature (°C): | + 37 | + 37 |
| Discharge temperature (°C): | + 80 | + 65 |

COMMENTS: The R-442A gives much more cooling capacity with much shorter time reaching the desired evaporation temperature and therefore the compressor runs less time. Thus we also reduce energy demand.

CONCLUSIONS

A system ready to face the immediate future:

R-442A (RS-50) is a refrigerant that is compliant with the new European regulations due to its low global warming potential (GWP), less than 50% compared to R-404A and R-507.

Big savings in terms of both energy and money:

The working temperature was reached much faster than if R-507 had been used.

Additionally, the big advantage compared to R-507, R-404A and the other HFC solutions currently on the market is that it offers a much better coefficient of performance (COP) at low temperatures. The system's owner is already seeing energy savings of approximately 25%, thereby easing the economic situation.

The installer is considering doing future installations with less reliance on the compressor thanks to the high capacity and efficiency of the refrigerant.

Big reductions in CO₂ emissions = more environmentally-friendly:

As a result of the combination of the reduction in both direct CO₂ emissions from refrigerant leakage and indirect emissions caused by electricity consumption, Sorli Discau will be able to significantly reduce its TEWI (Total Environmental Warming Impact), demonstrating its support for and responsibility towards the environment.

The project was carried out by the technical departments of **FRIGORÍFICOS DEL PENEDÉS S.A.** and **GAS-SERVEI, S.A.**