

MANUFACTURING OF FREEZING TUNNEL WITH RS-50 (R442A) -35°C Evaporation temp.

MUNICIPALITY: VIC, BARCELONA.

January 2015.

The company and its goals

As a result of its environmental policy and with a view to facilitating future installations, Frigorífics Ferrer, S.A., a leading company in the distribution of fresh fish and food in Catalonia, has integrated its production process with a Freezing Tunnel based on RS-50 (R442A), a refrigerant solution with high energy efficiency and low environmental impact.



The goal was to replace the Freezing Tunnel using R22 with a new one, which will use an innovative refrigerant with high cooling capacity and high energy efficiency.

Oriol Martínez, managing director of GAS N2ITROGEN S.L.U., developed the new project:

"We have installed our first tunnel for freezing fish. We are happy and proud to say that the tunnel is a success of our engineering and production team: it reduces the cycle's time, lowers costs and eliminates the formation of ice in the evaporators."

The choice of RS-50 (R442A) refrigerant gas has made it possible to achieve the following goals:

- ✓ Global Warming Potential (GWP) below 2500 to ensure the refrigerant's sustainability.
- ✓ High cooling capacity, operating at a very low temperature.
- ✓ High energy efficiency.

Installation description:

FREEZING TUNNEL

Coolant: 600 kg R442A (RS-50).

2 BITZER SCREW compressors:

HSN7461-70 (Y) with 70 HP

- Suction temperature: -27 °C.
- Suction pressure: 0.5 bar
- Discharging temperature: 65 °C.
- Discharging pressure: 17 bar

Lubricant: Reniso Triton SE 170

Condensed by: Air

Expansion valve: DANFOSS TE-20. Vent No. 9.

Evaporation temperature: -35 °C.



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Overheating: 8 °C
Environmental temperature: +10 °C.



Proposed Solution:

Oriol Martínez:

"We have proposed a refrigeration system for a plant that uses RS-50 refrigerant gas. The system is made up of the central unit, the condenser, the oil cooler, the tunnel and the new refrigeration piping network.

The new refrigerant allows an increase of approximately 30% in cooling capacity and with a GWP of 1888, the installation can be kept beyond 2020, as opposed to the R404A."

The tunnel was installed with RS-50 in January 2015, improving the following to date:

- ✓ R404A load recovery.
- ✓ Draining and changing of POE oil.
- ✓ Replacement of drying cartridges and oil filters.
- ✓ RS-50 load equivalent to R404A.
- ✓ Closing the expansion valves by 40%.
- ✓ Modification of temperature set points, adapting them to the new gas.



Conversion result:

Oriol Martínez:

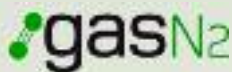
"This was a direct "drop-in" conversion with the previously used R404A refrigerant. The new central unit and the condenser were installed and combined with a network of pipes to the current evaporators, using the expansion system.

Since the mass flow of the RS-50 is 40% less than that of R404A, the expansion valves were adjusted and their openings were changed.

The condenser has four stages for regulating the operation of its ventilators, to optimise operation according to the condensation pressure.

Our customer is very satisfied:

- The intervention time is minimal.
- The end of R404A is anticipated.
- There is a great benefit from energy savings every day since the installation generates more cold without increasing electric consumption, and thus without increasing your electricity bill."



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Why choosing RS-50?

Lluís Giralt Jr., managing director of GAS SERVEI S.A.:

With the future increase of the cost of energy and the arrival of the new F-GAS, it is extremely important to create installations for the future with the lowest impact from emissions produced by the carbon footprint of refrigeration installations.



The installations made with RS-50 (R442A) are installations for the future that can be maintained without ban dates thanks to the GWP of 1888. Being a low GWP solution, in case of leakage, we will reduce direct CO₂ emissions (direct impact).

In addition, thanks to its high energy efficiency even at low temperatures, we can improve its energy efficiency by 20%-30%, depending on the application, compared to installations that will use R404A. In reducing electricity consumption, we will reduce indirect CO₂ emissions (indirect impact).

With RS-50 we move forward to the next ban in 2020 of R404A, a product normally used in this type of application until now.

We have also been able to reduce the installation cost by using lower compressor power, thanks to the high cooling power of RS-50.

CONCLUSION

THE TEWI IS CRUCIAL IN CHOOSING AN ALTERNATIVE REFRIGERANT TO R404A, SINCE WE ARE NOT ONLY DECREASING THE ENVIRONMENTAL IMPACT OF THE INSTALLATIONS, BUT ALSO THEIR RESULTING COSTS.

R442A IS THE MOST ECO-FRIENDLY FLUORINATED REFRIGERANT FOR THESE APPLICATIONS, SINCE IT HAS THE BEST TEWI ON THE MARKET AND THEREFORE A LOWER ECONOMIC IMPACT AS WELL.