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REFRIGERANT SOLUTIONS LTD RS-45 R22 DROP-IN ZERO ODP

R434A (RS-45) SIMPLIFIES RETROFITS

RETROFIT CASE STUDY OF THE CATALONIA GOVERNMENT RAILWAYS (FERROCARRILES DE LA GENERALITAT DE CATALUÑA)

Due to the concern about environmental legislation, under which Regulation CE 2037/2000 does not allow the use of virgin HCFCs for the maintenance and charging of air conditioning and refrigeration installations, Ferrocarriles de la Generalitat de Cataluña, FGC, started to change the refrigerants present in their refrigeration and heat pump installations on the railways.

In order to decide which was the most convenient refrigerant to replace R22, several tests were carried out with the most popular drop-in HFC blends in Europe, namely R422D and R434A (RS-45).

FGC had at that time the following railway cars using R22:

- Series 111 with a total of 20 units of 3 cars.
- Series 112 with a total of 22 units of 4 cars which have R22 air conditioning installations.
- Series 213 with a total of 42 units of 3 cars of which 20 are from the first series that have air conditioning R22 installations

UT – 111

Testing equipment
Condenser, evaporator & compressor

FEATURES SERIES 111 EQUIPMENT

- Cooling capacity: 30.000 Kcal/h
- Fresh air flow: 1.500 m3/h
- Total flow of treated air: 4.000 m3/h

In each car is a. compressor, condenser and evaporator.

- Compressors: Copeland semi-hermetic 4 pistons D4RA-2000-AWM, phase of 380 V
- Oil: Mineral Suniso 3GS
- Oil Capacity: 3.8 litres
- Condensers and evaporators: Stone Iberica
- Expansion valves: Danfoss R22 adjustable

FEATURES SERIES 112/213 HEAT PUMP

- Cooling capacity(text = 31 ºC): 35.400 Kcal/h
- Fresh air flow: 1.950 m3/h
- Total flow of treated air: 5.900 m3/h

Hermetic system per car located on the roof in the central area.

- Compressors: Carrier 6 pistons
- Oil: POE Suniso SL
- Oil Capacity: 4 litres
- Condensers and evaporators: Stone Iberica

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TESTING AND RETROFIT

The retrofits were carried out on 4 systems, 2 in the testing equipment and 2 in the trains.
The refrigerants tested were R422D and R434A (RS-45).
The installations were monitored to check all parameter.

CONCLUSION

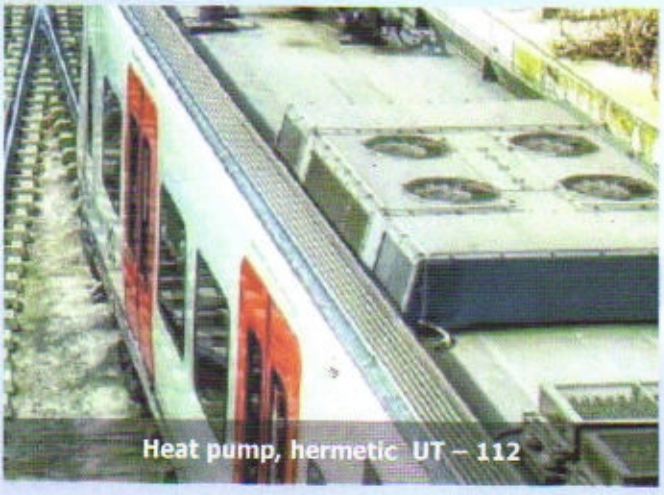
With R422D, the cooling temperatures were 4 or 5 ºC above the working temperatures compared to R22 and operating at maximum power. The high pressure switch was triggered which shut down the installation.

With R434A (RS-45), the operating temperatures were quickly achieved, power consumption was lower than with R422D which was running at maximum power, and the installation operated as normal.

The low temperature glide of R434A (RS-45) meant that in the event of a leak, the installation could be recharged without any problems. In purely technical terms, test have shown that RS-45 may be added to R22 without any adverse effects

The tests were carried out in the Central Workshop inde Rubí in Abril 2010.

Heat pump, hermetic UT 112 / 213



Heat pump, hermetic UT – 112

UT – 112

Note: Information provided by Gas-Servei S.A. www.gas-servei.com

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