

FORANE[®] FX 100 (R-427A*)

THE CONVERSION FROM R-22 TO FORANE[®] FX 100 (R-427A*) OF A WATER CHILLER

SERM (*Société d'Équipement de la Région Montpellieraine*), company in charge of the heating and air conditioning urban network of the city of Montpellier in the south of France successfully converted a water chiller from R-22 to FORANE[®] FX 100 (R-427A*) during the spring of 2005.

The water chiller selected for the conversion was supplying chilled water to an air conditioning network serving several public buildings in a commercial district.

As a result of the very satisfactory performance easily and rapidly achieved with FORANE[®] FX 100 (R-427A*) the customer decided to convert several other R-22 units at the end of 2005.

Unit description

The main characteristics of the converted water chiller are as follows:

- 2 parallel semi-hermetic reciprocating compressors
- nominal refrigerating power : 200 kW per compressor
- water-cooled extratubular condensing shell and tube condenser (88 m³/h)
- intratubular evaporating shell and tube evaporator
- electronic expansion valve
- refrigerant charge : 75 kg
- chilled water temperature set point : 6°C

Retrofit procedure

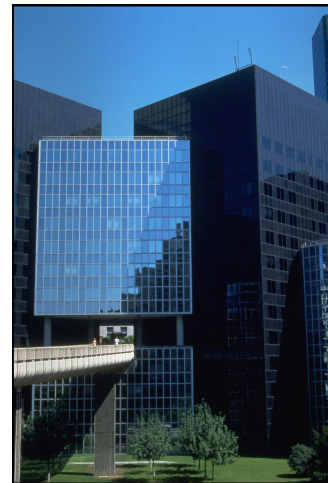
Non-toxic, non-flammable and zero ODP refrigerant, FORANE[®] FX 100 (R-427A*) only requires one oil draining and its replacement by a POE lubricant. Optimal performance close to R-22 can be achieved without long and costly rinsing of the circuit thanks to a high tolerance to residual original oil in the system. Oil return is fully satisfactory with up to 10-15% of residual mineral or alkylbenzene oil.

After ensuring that the R-22 equipment was in a good state and having measured the performance of the installation with the initial R-22 charge, the retrofit subsequently took place in 7 steps:

- 1- Recovery of the whole of the original R-22 charge
- 2- Draining of the mineral oil from the system
- 3- POE lubricant charge without rinsing step (Planetelf ACD 32)
- 4- Change of the filter drier
- 5- Evacuation of the installation
- 6- Recharge with FORANE[®] FX 100 (R-427A*)
- 7- Re-start of the installation and performance measurement after running conditions had reached a steady state

No modification of the installation was required.

*R-427A : pending ASHRAE public review and approval



Comparative data

Parameters		R-22	FORANE® FX 100 (R-427A*)
Evaporating temperature	°C	2.7	1.1
Condensing temperature	°C	40.3	44.0
Suction temperature	°C	7.1	9.2
Suction pressure	bar	5.4	5.0
Discharge temperature	°C	69.5	71.1
Discharge pressure	bar	15.5	17.1
Cooling power	KW	431	376
Power consumption	kW	122	124
Residual mineral oil	%	-	11%

During this field test, very satisfactory running conditions were reached immediately. The temperature set points were easily achieved with similar energy consumption as compared to R-22 despite a high level of residual mineral oil in the circuit. The performance of the installation continues to satisfy the customer's requirements after more than one year of service.

FORANE® FX 100 (R-427A*) consequently fully satisfies the requirements of the European regulations while enabling existing equipment to continue to perform well without the need for any long and costly plant modifications.

The versatility of FORANE® FX 100 (R-427A*) is also appreciated as it can be used to retrofit low temperature refrigeration equipment as well as air-conditioning installations, resulting in only one retrofit refrigerant for all R-22 units.

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