Plaisance du Touch, Toulouse, France

New built low energy luxury apartment building with a collective hot water circulation on air source heat pump with CO_2 as refrigerant,

Key facts

Building

Location	Toulouse, France
Construction	2015
Heat distribution	
Heated area	480 m²
Level of insulation	

Heat pump and source

Number of heat pumps	2
Installed capacity	2 x 4.5 kW
Operation mode	monoenergetic
down to -15°C	
Heat source	outside air source
Brand and type:	Aldes T.Flow Activ
developed by Sanden	
Refrigerant	R744 (CO_2)
Sound level	40 dB

Heating system

Heating	Radiant panels per room
Heat demand	kW
Heating temperature	35°C
Ventilation	Aldes centralized,
single flow	

Domestic hot water

Type of system	
Max. Temperature	65 °C
Circulation system	Central distribution
Legionella measures	thermal
Storage size	2 x 400 litres
Number of storage tanks	2
Storage losses	
Temperature control	

Other information

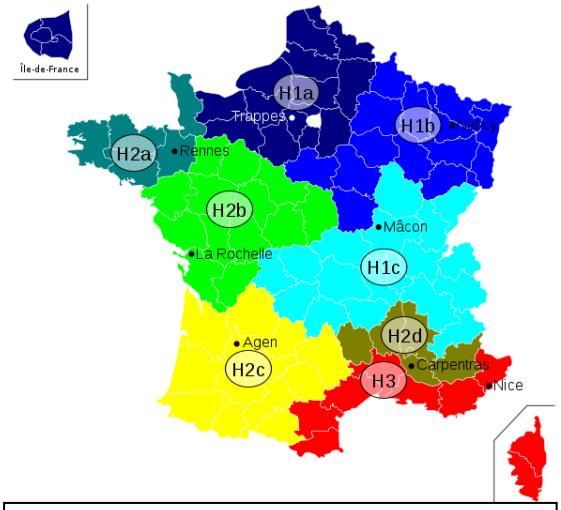
Functioning	100% HP above -15°C
COP EN147	3.4 (4XL), 3.2 (3XL)
DHW consumption	1600 l/d at 40°C
Electric energy	
Consumption year	kWh
Investments costs	

In a new built housing quarter with single family buildings in Plaisance du Touch a suburb of Toulouse, a small luxury apartment building "Villa Plaisance" is built in 2015. Plaisance du Touch is known for being the popular address for "Airbusiens" executives, due to its proximity to the aeronautical centre formed by the Toulouse - Blagnac - Colomiers triangle 15 minutes away, but also for its lively neighbourhood life.

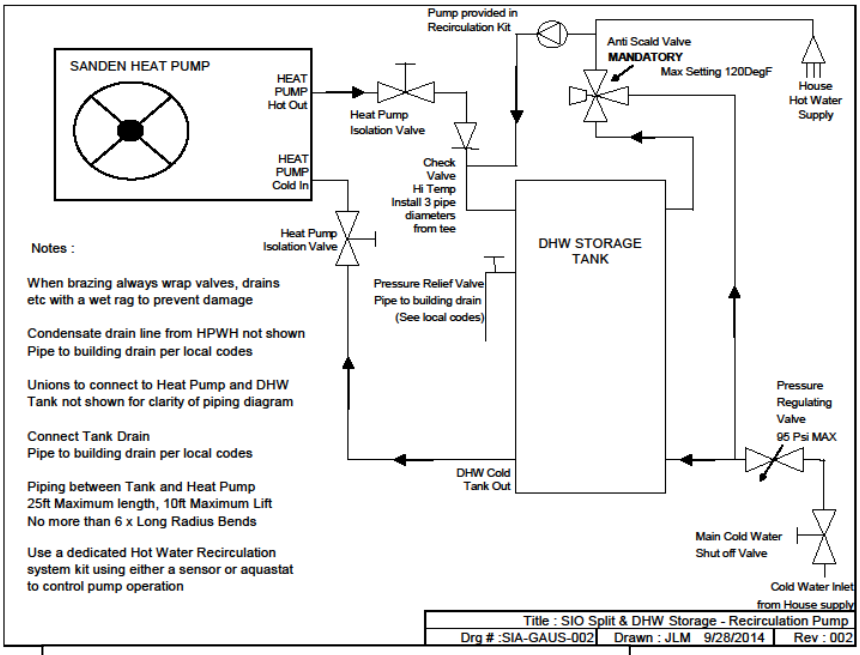
The "Villa Plaisance" has eight apartments on two levels, consisting of 2 x category T2 apartments of 46 m² and six category T3-apartments of 64 m² living area. The building is located in the French H2C climatic zone, which more or less dictates the technical installation. The apartments in the well-insulated building need less heating and more cooling. Heating is done by electric radiant panels and an Aldes centralized single flow ventilation is installed in the roof space for cooling. Domestic hot water is centrally produced in a technical room by two Sanden air source heat pumps, directly supply 400 litres storage tanks mounted in series. DHW is produced at 65°C to eliminate Legionella risks. A distribution loop (insulated pipes, 200 mm diameter) supplies all the dwellings. The heat pump has a 100% thermodynamic operation down to -15°C outside air when electrical back-ups can take over. The capacity of the heat pump can be varied from 3.5kW in the ECO mode to 4.5 kW in the Comfort mode. Each heat pump is able to produce 1300 litres per day, whereas the global housing consumption is 1600 litres per day at 40°C.

This type of CO2 system, in the deployment phase in France and in Europe, can be applied to capacities below 3kW and up to several tens of kW. This allows broad coverage on applications where DHW consumption is high, such as collective residential applications. The temperature level of DHW produced makes it possible to offer a solution to anti-legionella protection

Plaisance du Touch, Toulouse, France Technical details

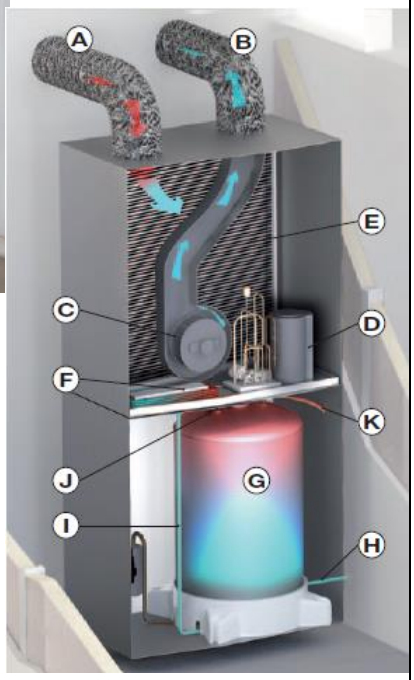


H2C climatic zone:
The most used type of ventilation is the Simple hygro B flow (73%). The fresh air intake vents are humidity sensitive, which will help refine the ventilation of the building. The ventilation group exists in low consumption which allows to better respond to the regulatory calculations of RT 2012.
The most used type of hot water energy in the H2C climatic zone is generated by a heat pump (96.4%)



Installation scheme with recirculation

Description of the technical concept



French Legislation for buildings:

For multi-family buildings, the airtightness has to be equal or lower than 1 m3 /(h·m2). The Thermal Regulation RT 2012 requires mandatory airtightness tests for all new dwellings. This airtightness is measured under 4Pa, with the indicator Q4Pa (Standard NF EN 13829).

Does not specifically require heat recovery systems for new dwellings. However, for new buildings or part of new buildings, air treatment for heating and cooling has to work in an "efficient way" (where heat recovery systems can be part of the solution). In this project the air source heat pump uses outside air.

The maximal thermal transmittance between the part of a building continuously occupied and the part of a building discontinuously occupied is 0.36 W/m2 K170. Apart from this general requirement, the thermal transmittance of the building's elements also contributes to the determination of the Cep (Consumption in primary energy) indicator.

Source: BPI - European Building Standards