House HQ1- Sant Cugat del Valls

**Primary energy need:**
78 kWhpe/m².year

(Energy-intensive building)

**Building Type:** Isolated or semi-detached house
**Construction Year:** 2019
**Delivery year:** 2021
**Address 1 - street:** Passeig de Valldoreix 08173 SANT CUGAT DEL VALLEs, España
**Climate zone:** [Csb] Coastal Mediterranean - Mild with cool, dry summer.

**Net Floor Area:** 311 m²

**Certifications:**

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**General information**

Comprehensive rehabilitation of a single-family home, certified Passivhaus EnerPHit Component Method, and VERDE. Healthy bio-based materials have been used wherever possible, including a lime render for the airtight layer on existing masonry walls, sprayed cellulose as interior insulation, and clay slabs with clay paints.

The ground and 1st floors are of traditional construction, with perforated brick walls. An extension has been added on the 2nd floor, with a system of a light prefabricated wooden framework, with wood fiber insulation and a ventilated façade.

The final "Blower Door" tightness test achieved N50 = 0.99 ach. The construction details were analyzed in detail during the design phase to reduce and eliminate thermal bridges, together with dynamic hygrothermal simulation with WUFI to assess and eliminate the risk of moisture damage, since the existing brick walls were installed with internal thermal insulation.

Regarding the facilities, an air-water heat pump is used for heating, cooling and DHW production. Underfloor heating is used for both heating and cooling, supported by dehumidifiers installed in the mechanical ventilation system with heat recovery. Finally, the house has a 2.2 kWP photovoltaic generator.
Architectural description

The rehabilitation of the existing house HQ1 has been carried out with natural, healthy materials and low in VOC's (volatile organic content), such as lime plaster for the hermetic layer, cellulose spray for internal thermal insulation and clay panels with natural paints for the finish.
The openings have pine wood carpentry, Carinbisa V92, installed with multifunctional expansion tape ISO-BLOCO ONE from the company ISO-Chemie and triple glazing with low-emissive film and solar control. Both the carpentry and the expansion tape have a Passivhaus component certificate, a guarantee of hermeticity and insulation in the most critical points of the façade. The openings are protected with exterior blinds, stackable and adjustable, which are controlled by home automation.

### Energy

#### Energy consumption

- **Primary energy need**: 78.00 kWhpe/m².year
- **Primary energy need for standard building**: 250.00 kWhpe/m².year
- **Calculation method**: Primary energy needs
- **Final Energy**: 56.23 kWhfe/m².year

#### Envelope performance

- **Envelope U-Value**: 0.59 W·m⁻²·K⁻¹
- **More information**:
  - **Facade**:
    - Zinc finish + wooden board
    - Ventilated chamber
    - Rothoblaas Traspir 110 breathable-waterproof membrane
    - OSB 3 board
    - Pavatex Pavaflex wood fiber insulation [between structure]
    - OSB 3 board
    - Camera facilities
    - Finish wood panel
    - U-Value: 0.186 W/(m²K)
  - **Deck**:
    - Zinc finish + wooden board + ventilated chamber
    - Rothoblaas Traspir 110 breathable-waterproof membrane
    - Pavatex Isoroof wood fiber insulation
    - OSB 3 board
    - Pavaflex wood fiber insulation [between structure]
    - Camera facilities
    - Finish wood panel
    - U-Value: 0.149 W/(m²K)
  - **Additional**:
    - Passivhaus certified carpentry, Carinbisa V92 pine
    - EcoClay PLAC clay plates
    - Cork insulation Aglocork Floors
    - Kerakoll Biocalce lime plaster
- **Indicator**: n50
- **Air Tightness Value**: 0.99

### Renewables & systems

#### Systems

- **Heating system**:
  - Heat pump
  - Radiant ceiling
- **Hot water system**:
  - Heat pump
- **Cooling system**:
  - Reversible heat pump
- **Ventilation system**:
  - Double flow heat exchanger
- **Renewable systems**:
- Solar photovoltaic

Renewable energy production: 11.40%

Environment

GHG emissions

GHG in use: 13.44 KgCO₂/m²/year

Products

- **ComfoAir Q600**
  Zehnder Group
  info[at]zehnder.es
  [https://www.zehnder.es/](https://www.zehnder.es/)
  Product category: Sensitive heat recovery system, certified by Passivhaus.

- **Altherma Heat Pump with double flow**
  Daikin
  rabanal[[at]]daikin.es
  Product category:

- **Bekotec low profile underfloor heating**
  Schlütter
  info[at]schluter.es
  [https://www.schluter.es/schlueter-bekotec.aspx](https://www.schluter.es/schlueter-bekotec.aspx)
  Product category:

Costs

Building Environmental Quality

- indoor air quality and health
- acoustics
- comfort (visual, olfactive, thermal)
- water management
- energy efficiency
- renewable energies
- products and materials

Contest
Reasons for participating in the competition(s)
La rehabilitación de la vivienda existente HQ1 se ha realizado con materiales naturales, saludables y bajo en VOC’s (contenidos orgánicos volátiles), como enlucido de cal para la capa hermética, proyectado de celulosa para el aislamiento térmico interior y paneles de arcilla con pinturas naturales para el acabado. Tanto la carpintería como la cinta expansiva tienen certificado de componente Passivhaus, garantía de hermeticidad y aislamiento en los puntos más críticos de la fachada. La vivienda cuenta con un generador fotovoltaico de 2,2 kWp, el equipo de producción térmica para calefacción, refrigeración y ACS es una bomba de calor aire-agua. Calefacción y refrigeración de realizan mediante suelo radiante-refrescante de baja inercia con dos deshumidificadores de Zehnder.

Building candidate in the category

Users' Choice