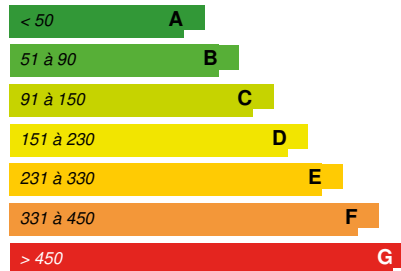


100X100MADERA HOUSE

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Building Type : Isolated or semi-detached house
Construction Year : 2014
Delivery year : 2014
Address 1 - street : Nunki 1 28794 GUADALIX DE LA SIERRA, MADRID, España
Climate zone :

Net Floor Area : 155 m²
Construction/refurbishment cost : 163 640 €
Number of Dwelling : 1 Dwelling
Cost/m2 : 1055.74 €/m²

General information

100X100 MADERA HOUSE

- Project type: New construction
- Building type: Detached house
- Year of construction: 2014
- Year of completion: 2014
- Climate classification: Csa
- Gross internal area: 155 m2
- Construction cost: 163 640 €
- Number of units: 1 Home
- Cost/m2: 1 056 €/m2
- Cost/Home: 163 640 €/Home

See more details about this project

Data reliability

Assessor

Stakeholders

Stakeholders

Function : Designer
BioArk Arquitectura

Gorka Elorza

<http://www.bioarkestudio.com>

Function : Other consultancy agency
RC Arquitectura

Mrosa de la Iglesia Arranz y Cristina Romero Medina.info@rcarquitectura.com

www.rcarquitectura.com
Passivhaus adviser's office

Function : Developer
100x100madera

Raquel Peláez

www.100x100madera.com

Function : Construction Manager
Grupo Final S.L

José Juan Ávila

www.grupofinal.com

Contracting method

General Contractor

Owner approach of sustainability

Environmental philosophy of the promoter: We decided to build this building to demonstrate that it is possible to live in a healthy eco-friendly home, which is respectful to the environment and has no consumption, and all this within a reasonable price. We understand that it is hard to believe that you can have comfort and health in your home with a consumption of only €15/month. Therefore, we wanted to prove it by building a house that also serves as a showroom and that we could monitor in order to show all these data.

Architectural description

The case study consists of a single-family home that serves as a showhome to the property developers who are developing the project. The property, a catalogue model, is located in Guadalix de la Sierra (Madrid). Its conception and development converge three key features: 1_ An industrialized system where dry construction prevails. 2_ The use of natural materials. 3_ Seeking maximum comfort and energy savings through compliance with the Passivhaus standard. Part of the work that was carried out during the project phase consisted of adapting the catalogue model, therefore pre-designed, to comply with the Passivhaus standard. The industrialized system that was used consists of a light frame of wood from the north of Finland. This structure is perfectly cut and numbered from the factory. At the construction site, the only work to be carried out is the assembly. Apart from the foundation, which is traditional, the rest of the materials that are used are that of dry assembly. As in all industrialized systems, the construction times and waste that is generated are reduced significantly. For the most part, the materials that are used in the building are natural. The frame is made out of red pine wood, the insulation blankets are made out of wood fibres and the enclosure of the structure is made out of wood shaving boards. The cladding plasterboard is fixed to the structure via uprights, which are also made out of wood, thus avoiding the use of any metallic element. The paints that are used in the interior of the house are ecological and the primer for the treatment of the wood is completely natural. The Passivhaus standard is a certification. As far as buildings are concerned, Passivhaus is the most demanding in the world in terms of energy efficiency. With a Passivhaus building, it is possible to provide the energy to heat and/or cool the building only using the comfort ventilation. Therefore, a conventional air conditioning system is not required.

If you had to do it again?

Having completed the work for the adaptation of a pre-designed home in order to comply with the Passivhaus standard, we have realized that the initial design of a building is key if the objective is to comply with the requirements established by the Passivhaus standard. Criteria, such as bioclimatic, form factor, the orientation, solar gain or the protection of spaces, according to every climate or season, have to be taken into account. This is fundamental in order to avoid excess work during the project phase, as well as to prevent cost overruns during the execution phase.

Building users opinion

Ander: it would be difficult to be further surprised by the behaviour of this building. While

everyone in Madrid is suffering from the heat wave, with almost 40 degrees and temperatures in homes of 32 or 33 degrees, or spending money on air conditioning, we are feeling incredible comfort. We live isolated from the external climatology. Since we are always at the same temperature both in summer and winter, we are indifferent. Raquel: One thing that has surprised me is that we do not suffer from dry respiratory tracts. We have an average of 41% humidity. Our house never has any bad smells - it always smells fresh, with a wood scent. I never notice stuffy rooms in the morning when I get up from bed or after a friend's gathering...ultimately, it always smells good. In the mornings, I wake up more rested and without headaches.

Ander: The light in our house is the best! We do not switch on the lights until the sun has gone down completely. As 65% of the house is made out of glass and it is a bioclimatic house, it gives us total joy to see so much light throughout the day. You feel uplifted from the minute that you get up.

Raquel: The silence is one of the things that shocked me the most when I went to live there. Occasionally, I would see a car or a truck go past in front of the house and I literally could not hear it. Additionally, the sound between the rooms is almost zero, you can hardly hear anything.

Energy

Energy consumption

Primary energy need : 110,00 kWhpe/m².year
 Primary energy need for standard building : 273,00 kWhpe/m².year
 Calculation method : Other
 CEEB : 0.001
 Final Energy : 42,00 kWhfe/m².year
 Breakdown for energy consumption :
 Primary energy corresponding to ACS, heating and auxiliary power _68 kwh/m2a

Envelope performance

Envelope U-Value : 0,14 W.m⁻².K⁻¹
 More information :
 The U value: 0.14W.m-2.K-1
 More information: the total envelope thermal transmittance values have proved to be the following:
 Facade: U = 0.135 W/m2K with a total thickness of 39.9 cm.
 Roof: U = 0.138 W/m2K with a total thickness of 38.9 cm.
 Floor insulation: U = 0.164 W/m2K with a total thickness of 29.4 cm.
 Carpentry: U = 1.12 W/m2K (with thermal bridge spacer ψ = 0.040 W/mK)
 Triple glazing 4be/20/4/20/4be: U = 0.55 W/m2K and g = 0.55
 DIN in 13829 - n50» (in 1/h-1) (I4) m3/H.m2 n50 (Vol/H) Q4

Indicator : EN 13829 - n50 » (en 1/h-1)
 Air Tightness Value : 0,55

Users' control system opinion : The system that we have installed is most comfortable. We do not have to do anything to control it. Although it is automatically done, we can manually set the temperature and ventilation that we want. For example, if one day, we cook something and want to eliminate the smell quickly, we can increase the ventilation. In addition, the comfort provided by the aerothermal heating system is enormous. We only have to worry about raising or lowering the inside temperature. We are lucky that the house is being monitored - not only do we feel comfortable but also, we see all the real time data for the temperature, humidity and cost.

Renewables & systems

Systems

Heating system :
 • Heat pump
 • Low temperature floor heating
 • Tape

Hot water system :
 • Heat pump

Cooling system :
 • Reversible heat pump
 • Radiant ceiling

Ventilation system :
 • Nocturnal ventilation
 • Free-cooling
 • Double flow heat exchanger

Renewable systems :
 • Other, specify

Environment

Comfort

Health & comfort : Criteria, such as bioclimatic, form factor, the orientation, solar gain or the protection of spaces, according to every climate or season, have to be taken into account. This is fundamental in order to avoid excess work during the project phase, as well as to prevent cost overruns during the execution phase.

Calculated indoor CO2 concentration :

El sistema de ventilación mecánica controlada permite la constante entrada de aire limpio a la vivienda. El sistema cuenta con un medidor de CO2 que al llegar a determinado nivel, aumenta el caudal de ventilación

Calculated thermal comfort : Temperaturas operacionales: 25°C en verano y 20°C en invierno

Products

Product

ISONAT PLUS 55 FLEX wood fibre insulation

ISONAT

contact@isonat.com

<http://www.isonat.com>

Product category :

Thermal insulation that is composed of wood fibres (from the remains of pruning and cleaning of forests) and hemp. Recyclable and compostable product. No settlement with the pass of time. Conductivity value of 0.38W/mK. It absorbs humidity and restores it progressively with a healthier atmosphere.

The promoter often uses this material for its natural and ecological characteristics.

RIWEGA sealing tapes

Riweга

info@riweга.com

<http://www.riweга.com/>

Product category :

Sealing tape to place on the windows (between carpentry frame and facade wall), to tape the layer of osb. This serves as a sealing line in the home and ensures sealing throughout the installation process

The use of this product has helped air tightness 0.55 ren/hour at 50 pascals. This value is difficult to achieve in light wooden frame buildings due to the numerous joints that it presents.

V92 Woodworks

Carinbisa

presupuesto@carinbisa.com

<http://www.carinbisa.com/>

Product category :

Exterior windows and balcony doors with wooden frames and argon filled triple.

The use of type V92 carpentry with argon filled triple glazing and warm edge spacers have helped us to achieve the values that are required by the Passivhaus standard.

Costs

Construction and exploitation costs

Cost of studies : 12 500 €

Total cost of the building : 180 000 €

Subsidies : 155 000 €

Urban environment

Single-family detached house, located in a residential area in the municipality of Guadalix de la Sierra

Land plot area

Land plot area : 630,00 m²

Parking spaces

Street parking, no parking limitations.

Building Environmental Quality

Building Environmental Quality

- indoor air quality and health
- comfort (visual, olfactive, thermal)
- energy efficiency
- building end of life management
- building process
- products and materials

Contest

Building candidate in the category



Materiales de origen biológico



Edificios de consumo nulo



Salud y Confort



