


## Natural cosmetics laboratory, shop and office

by Rubén Sastre Rubio / 2016-06-05 09:54:02 / Espagne / 14532 / ES



Primary energy need :

## 48.41 kWhpe/m<sup>2</sup>.year

(Calculation method : )

**ENERGY CONSUMPTION**

*Economical building*

< 50	<b>A</b>
51 à 90	<b>B</b>
91 à 150	<b>C</b>
151 à 230	<b>D</b>
231 à 330	<b>E</b>
331 à 450	<b>F</b>
> 450	<b>G</b>


*Energy-intensive building*

**Building Type** : Other building  
**Construction Year** : 2016  
**Delivery year** : 2016  
**Address 1 - street** : arado 33-1 40197 SAN CRISTÓBAL DE SEGOVIA, España  
**Climate zone** : [Csb] Coastal Mediterranean - Mild with cool, dry summer.


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**Net Floor Area** : 187 m<sup>2</sup> SHON  
**Construction/refurbishment cost** : 238 680 €  
**Number of none** : 1 none  
**Cost/m2** : 1276.36 €/m<sup>2</sup>

**Certifications :**



**Proposed by :**



PASSIVHAUS

General information

The property needed to construct a building to house a Laboratory of natural cosmetics that also served as a shop, warehouse and office. In addition, due to the intrinsic characteristics of its activity (natural cosmetics), and its special sensitivity to the environment, they wanted the building to consume the least amount of energy possible, and to use, within the available budget, materials as sustainable as possible. The land and climate, as in most cases, were decisive for the building of the project. It is located on a small plot of 202m<sup>2</sup>, in the municipality of San Cristobal de Segovia province of Segovia, Spain. At an altitude of 1079m above sea level and at a distance of about 4 km from the Sierra de Guadarrama. The climate in the area of Segovia is , according to Koppen climate classification, CSB (Oceánico dry summer). It is similar to typical rainfall in the Mediterranean, but with characteristics of continental climates in terms of temperatures, that are more extreme. The summers are pretty hot and pretty cold winters with a swing of 18.5 ° C. The summer season is the driest and very often exceed 30 ° C, occasionally reaching over 35 ° C. However, in winter temperatures often drop below 0 ° C, producing numerous frosts at night and occasional snow. Rainfalls follow a very similar to the typical Mediterranean climate pattern and are among the 400 or 650mm with a maximum during the fall and spring. The lower influence of the sea, however, makes it drier than the typical climate. The average annual temperature in San Cristobal de Segovia is 10.9 ° C. The precipitation is 492 mm per year.

#### PURPOSE, FUNCTIONS AND PURPOSE OF THE PROJECT. ENERGY TARGETS.

- The objectives set by the client to the building in question are:
- The building must be certified as "passive building"; for non-residential use, according to the protocol PHI Darmstadt (DE) environmental objectives.
- Minimization of energy consumption for energy savings.
- Use of construction materials and systems with low environmental impact.
- Use of renewable energy with the goal of reducing CO2 emissions.
- Good indoor air quality.
- Use of materials without emission of harmful substances. PROGRAM TARGETS.
- The building must consist of Shop with:
- Direct access to the south façade (main entrance).
- The largest possible surface for storage, with access from the main facade.
- Manufacturing area that meets the requirements set by the code of good practices GOOD MANUFACTURING PRACTICE OF COSMETICS (bpfc). (UNE-EN ISO 22716) CE No. 1223/2009, with separation of product reception areas, cleaning, manufacturing and packaging.
- Office administration.

## See more details about this project

<http://e2arquitectura.wix.com/casapasiva#!blank/bo1ra>

<http://www.timberonlive.com/servicios-timberonlive/passivhaus-amapola/>

[https://www.facebook.com/TimberAstur/photos/?tab=album&album\\_id=945177588904822](https://www.facebook.com/TimberAstur/photos/?tab=album&album_id=945177588904822)



## Data reliability

3rd part certified

## Stakeholders

### Stakeholders

Function : Designer

E2 ARQUITECTURA E INNOVACIÓN SLP

Rubén Sastre Rubio: 657074867, rubensat@gmail.com

<http://e2arquitectura.wix.com/casapasiva>

Function : Construction Manager

TimberOnlive

Juan Ramón Fontela: 34 985 963 332

<http://www.timberonlive.com/servicios-timberonlive/passivhaus-amapola/>

## Contracting method

Lump-sum turnkey

## Owner approach of sustainability

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## Architectural description

The building has been designed with two main facades, North and South, with the South being the main access to the store and to the warehouse. Inside the ground floor a manufacturing room is designed with typical characteristics of the white or clean rooms. A staircase in the rear area of the store gives access to the first floor where offices will be placed in the south, a toilet and another store. In the latter store the facilities room is located. The building is designed on two floors, on foundation slab and timber-framed insulating filler, in order to have the maximum possible compactness and the maximum ratio useful / floor area. It has been designed based on solar gain and shading marked by passivhaus principles, besides having the capacity and cross ventilation for natural cooling. It has also been used a Canadian well which introduces warm air to the VMC, to maximize passive measures. It has been chosen to simplify the number of possible materials to minimize waste. It is also about materials with a great capacity for future recovery, using wood as much as possible.

## If you had to do it again?

We would do a more comprehensive industrial processes they use, along with the heat they generate.

## Building users opinion

Pleased by the improvement over its previous laboratory

## Energy

### Energy consumption

Primary energy need : 48,41 kWhpe/m<sup>2</sup>.year

Primary energy need for standard building : 370,32 kWhpe/m<sup>2</sup>.year

Calculation method :

CEEB : 0.0013

Breakdown for energy consumption :

heating: 13.92 kWh / cooling m2 year: 0.27 kWh / m2año ACS: 4.58 kWh / m2 year LIGHTING: 29.65 kWh / m2 year

More information :

According to PHPP Primary Energy Consumption nonrenewable according PASSIVHAUS: Demand heating kWh / (m<sup>2</sup>a) 12 Charging heating W / m<sup>2</sup>8 demand cools. & Deshum.kWh / (m<sup>2</sup>a) 1 Charging cooling W / m<sup>2</sup>1 overheating frequency (> 25 ° C)% - Frequency excessively high humidity (> 12 g / kg)% 0 Result test pressure N501 / h0,4 Demand EPkWh / ( m<sup>2</sup>a) 118 Demand PERkWh / (m<sup>2</sup>a) 55

### Envelope performance

Envelope U-Value : 0,15 W.m<sup>-2</sup>.K<sup>-1</sup>

More information :

U exterior wall 0,154 W / m<sup>2</sup>K U party wall 0,138 W / m<sup>2</sup>K U sloping roof 0,141 W / m<sup>2</sup>K U sill 0,169 W / m<sup>2</sup>K U windows "Uw"; 0.904 to 1.028 W / m<sup>2</sup>K

Building Compactness Coefficient : 0,63

Indicator : EN 13829 - n50 » (en 1/h-1)

Air Tightness Value : 0,44

Users' control system opinion : Control of each plant with adjustable thermostats that exceed the weekly schedule. In addition you also have independent control over the manufacturing room. Regulating ventilation manually done globally, with 4 steps of different air volumes. It also has a daily, weekly and annual programming.

## Renewables & systems

### Systems

Heating system :

- Heat pump
- Fan coil

Hot water system :

- Heat pump

#### Cooling system :

- Reversible heat pump
- Fan coil

#### Ventilation system :

- Natural ventilation
- Nocturnal Over ventilation
- Free-cooling
- Double flow heat exchanger

#### Renewable systems :

- Heat pump

Renewable energy production : 63,00 %

#### Other information on HVAC :

The small heating and cooling load is supplied with a heat pump VAILLANT low power, with three inner fan coils.

Brink Climate Systems BVB, Renovent Excellent 300 (Plus) PHI-certified ventilation appliance air controlled mechanical ventilation with heat recovery and heat exchanger with the ground (Canadian well). specif. Efficiency 81%

#### Solutions enhancing nature free gains :

Canadian well to introduce warm air system VMC.

## Environment

### GHG emissions

GHG in use : 18,22 KgCO<sub>2</sub>/m<sup>2</sup>/year

#### Methodology used :

Spanish Royal Decree: 47/2007

Building lifetime : 50,00 year(s)

### Indoor Air quality

System mechanical heat recovery ventilation and by-pass in summer.

### Comfort

**Health & comfort :** The Passivhaus standard ensures sufficient inner surface temperature not to suffer the effect of cold wall. In addition the internal temperature was calculated for winter does not fall below 20 ° C in summer and does not rise from 25 to 10% of the time.

**Calculated thermal comfort :** VERANO: 25°C INVIERNO: 20°C

**Measured thermal comfort :** VERANO: 25°C INVIERNO: 20°C

## Products

### Product

Double flow ventilation with heat recuperator

SIBER

iagudiez@siberzone.es

<http://www.siberzone.es/>

#### Product category :

Brink Climate Systems BVB, Renovent Excellent 300 (Plus) controlled mechanical air ventilation with heat recovery and heat exchanger with the ground (Canadian well). specif. Efficiency 81%

Well, easy installation.

## Costs

## Construction and exploitation costs

Total cost of the building : 2 400 000 €

## Urban environment

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## Land plot area

Land plot area : 202,00 m<sup>2</sup>

## Built-up area

Built-up area : 2 016,00 %

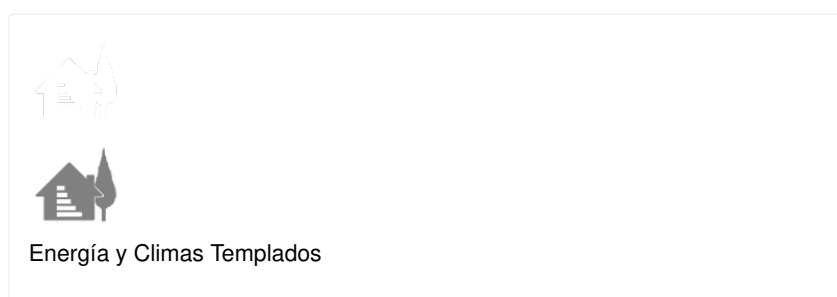
## Building Environmental Quality

### Building Environmental Quality

- indoor air quality and health
- acoustics
- energy efficiency
- renewable energies

## Contest

### Building candidate in the category





Gran premio: Construcción Sostenible



Premio de los usuarios



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