PH DESIGNER RENEWAL

The Deerings

Abstract
This document has been written following the Passivhaus Institute guidance to renew the Passivhaus Designer obtained with certifier WARM in July 2015

Ymproving-Passivhaus
Francisco Cerezuela
Aug 2020

Job Name: The Deerings

Passivhaus Database ID: 5282

Revision: -

Written: FC

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An ultra low energy, contemporary family home, using as many natural materials as possible. Sweet Chestnut cladding, with English Ash interior flooring and panelling.

High ceilings and open plan on the ground floor with a double height space and south facing windows, North facing child bedrooms on the upper floor.

Incorporates automatic solar blinds and skylight ventilation for summer, and oversized solar thermal array with thermal store and water heating airtight log stove for the winter. PV and 3-phase EV charger. Rain water harvesting system for toilets and the garden, and an airtight PH compliant cat flap with RFID.

<table>
<thead>
<tr>
<th>Component</th>
<th>U-value (W/(m²K))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roof</td>
<td>0.096</td>
</tr>
<tr>
<td>Terrace</td>
<td>0.130</td>
</tr>
<tr>
<td>Wall</td>
<td>0.107</td>
</tr>
<tr>
<td>Floor</td>
<td>0.092</td>
</tr>
<tr>
<td>Garage</td>
<td>0.107</td>
</tr>
<tr>
<td>Cat Flap</td>
<td>0.743</td>
</tr>
<tr>
<td>MVHR Unit</td>
<td>Paul Novus 450</td>
</tr>
<tr>
<td>Heating Demand</td>
<td>12.0 kWh/(m²a)</td>
</tr>
<tr>
<td>Primary Energy (PE)</td>
<td>45.0 kWh/(m²a)</td>
</tr>
<tr>
<td>Airtightness</td>
<td>0.52 ACH</td>
</tr>
</tbody>
</table>
2. ABSTRACT OF BUILDING PROJECT

This single detached family unit in the heart of Hertfordshire was designed to home a family of 5 members within two storeys and rear garden.

The client set a 400 m² GIA (342.7 m²) property with the requirements to be as efficient as possible as well as make use of sustainable and local materials where possible.

The result was a timber frame structure with minimised thermal bridging, triple glazed windows and a mechanical ventilation with heat recovery to work in tandem with a gas boiler, a wood burning stove, solar thermal and PV panels.

After the first year of occupancy the client confirmed the total energy bills were zero, as the wood burning stove, the solar thermal and PV panels were enough to meet the demand, not to say the high level of comfort they experienced after being living in an old and leaky home for many years.
3. ELEVATION VIEW OF BUILDING (PHOTO)
4. EXEMPLARY PHOTO FROM THE INSIDE OF THE BUILDING
5. SECTIONAL VIEW OF THE BUILDING
7. CONSTRUCTION OF FLOOR SLAB

DESCRIPTION

Concrete slab on EPS insulation 400mm, with reduced depth at given point.

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8. CONSTRUCTION OF THE EXTERNAL WALLS

DESCRIPTION

400mm Twin timber stud fully filled with blown-in insulation WARMCELL.
9. CONSTRUCTION OF THE ROOF

DESCRIPTION

400mm I-beams fully filled with blow-in insulation WARMCELL.
10. WINDOW INSTALLATION

DESCRIPTION
Internorm HF Series and Front Door AT410 installed centred to the building fabric

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11. AIRTIGHTNESS

**Building and Test Information**

<table>
<thead>
<tr>
<th>Test file name:</th>
<th>51 The Deerings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer:</td>
<td>Trunk Low Energy Building Ltd</td>
</tr>
<tr>
<td>Building volume:</td>
<td>886.5</td>
</tr>
<tr>
<td>Floor Area:</td>
<td>173.1</td>
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<tr>
<td>Envelope Area:</td>
<td>650</td>
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**Results**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air flow at 50 Pa, $V_{50}$ [m³/h]</td>
<td>501.5</td>
</tr>
<tr>
<td>Air changes, $n_{50}$</td>
<td>0.57</td>
</tr>
<tr>
<td>Equivalent leakage area at 50 Pa [cm²]</td>
<td>249.0</td>
</tr>
<tr>
<td>Permeability at 50 Pa [m³/h/m²]</td>
<td>0.771</td>
</tr>
</tbody>
</table>

**DESCRIPTION**

The airtight membrane was defined by the 12.5mm smartply vapartight board (green in photos) internally fixed to the inner side of the structure and all junctions sealed with Tescon vana tape. The floor was considered airtight already as it was done in concrete. All junctions were sealed with Tescon tape as well.
12. VENTILATION LAYOUT

DESCRIPTION

Rigid ducting system with attenuators and risers within the intermediate floor, false ceiling at First floor and internal partition walls.
13. VENTILATION UNIT

DESCRIPTION

Paul Novus 450 – serial No. 19016 installed in utility room cupboard at Ground floor.

Installation and commissioning by Roderick Williams

Effective Heat Recover: 87.7%

Electrical Efficiency (Wh/m³): 0.29
14. HEAT SUPPLY

The heat system was formed by a gas boiler, wood burning stove, solar thermal panels and energy store 500 litres.

DESCRIPTION

- Worcester Greenstar 24Ri ERP boiler
- Rokossa Wasserfuhrender Kaminofen IG2 wood burning stove
- Small Solar company – Solar thermal panels
- Energystore Biosolar 500 litre
# PHPP VERIFICATION PAGE

## Specific building characteristics with reference to the treated floor area

<table>
<thead>
<tr>
<th>Space heating</th>
<th>Criteria</th>
<th>Alternative criteria</th>
<th>Fulfilled?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating demand kWh/m²</td>
<td>12.0</td>
<td></td>
<td>yes</td>
</tr>
<tr>
<td>Heating load W/m²</td>
<td>9</td>
<td></td>
<td>yes</td>
</tr>
<tr>
<td>Frequency of overheating (&gt; 20°C) %</td>
<td>2</td>
<td>≤ 10</td>
<td>yes</td>
</tr>
<tr>
<td>Frequency excessively high humidity (&gt; 12 g/kg) %</td>
<td>0</td>
<td>≤ 20</td>
<td>yes</td>
</tr>
<tr>
<td>Airtightness</td>
<td>0.5</td>
<td>≤ 0.6</td>
<td>yes</td>
</tr>
<tr>
<td>Non-renewable Primary Energy (PE) PE demand kWh/m² Pa</td>
<td>46</td>
<td>≤ 120</td>
<td>yes</td>
</tr>
<tr>
<td>Primary Energy Renewable (PER) Generation of renewable energy kWh/m² Pa</td>
<td>37</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

I confirm that the values given herein have been determined following the PHPP methodology and based on the characteristic values of the building. The PHPP calculations are attached to this verification.

Passive House Class? yes

Signature: Francisco Cerezuela

Certification ID: 15021_YMPP_FIN_20170523_FW

Issued on: 2017-05-23

City: Plymouth

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16. CONSTRUCTION COST

Client prefers not to disclose it

17. YEAR OF CONSTRUCTION

2017

18. DESIGN AND ARCHITECTURE

Gresford Architects were appointed to develop the construction stage design and site supervision during the construction of the project.

The architectural team was formed by Tom Gresford, Managing Director, Sarrah El-Bushra, Lead architect and I, Technical architect, and Passivhaus Designer.

19. BUILDING SERVICES

Green Building Store provided the design and materials for the ventilation system.

The client himself was in charge of designing and getting all materials to site related to the heating system as described earlier.
WARM and I worked together in the building physics of the project, agreeing on the final thermal bridges reflected in the PHPP, such as the chimney operation, SVPs, the raft insulation downstand or the structural steel required. Below there is an example of TB calc I had to provide.
21. STRUCTURAL DESIGN

DESCRIPTION

The structural design was part of the structural subcontractor package, MBC Timber Frame.

I was involved in the design and final approval of the structure to minimise all thermal bridges as much as possible without incurring in further cost.

22. USER’S EXPERIENCE

After the first year of occupancy the client confirmed the total energy bills were zero, as the wood burning stove, the solar thermal and PV panels were enough to meet the demand, not to say the high level of comfort they experienced after being living in an old and leaky home for many years.
23. PUBLICATIONS

The Project has been covered in the Passivhaus Plus magazine, AJ Journal and several magazines specialised in housing and interior design.


https://passivhaustrust.org.uk/news/detail/?nId=746#.WpbHf2acYUH

It has won the RIBA East Award 2018.


It has been shortlisted in several awards in 2018 and 2019.

https://www.architectsjournal.co.uk/news/riba-reveals-east-region-awards-shortlist/10029704.article

http://www.structuraltimberawards.co.uk/winners-and-finalists/2018-finalists

https://www.frameawards.com/longlist