



## Low energy buildings - Case Study: **Princedale Road Passivhaus**



### Category / year

Renovation - Small residential (1-2 family houses) / 2011



### Address

100 Princedale Road, London



### Contact details

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### Pictures





## Description of the building

### Detailed description:

Built in the 1850's, 100 Princedale Road is the first retrofit to be awarded Passivhaus accreditation in the UK. The terrace's age, and its location within the Holland Park Conservation Area of London, led to several additional challenges as part of the build:

- This prevented the use of external insulation and meant that windows and doors had to be specially designed to match the period style.
- The property also features solid brick walls which prevent the use of cavity wall insulation.
- As a retrofit, the building featured more challenging junctions and room designs than would be found in a purpose built Passivhaus. This meant detailing had to be carefully planned and carried out.

### Building envelope:

- *Pitched roof:* a 130 mm thickness of PU insulation Kingspan Thermawall TW55 was fitted between the rafters and followed by a 12 mm layer of OSB, which runs continuously throughout the property, and is sealed around windows, doors and other junctions using tape, forming an air-tight seal. A further 50 mm layer of TW55 was then installed, followed by a layer of plasterboard (U-Value 0.15 W/m<sup>2</sup>·K)
- *External Walls:* 25 mm vented cavity was left between the brickwork and the insulation, preventing the accumulation of condensation within the wall. 150 mm of TW55 was then installed, followed by the air-tight OSB layer. As with the roof a further 50 mm of TW55 was installed to allow for a service zone where sockets can be fitted without perforating the airtight layer, and then finally a layer of plasterboard was added. Junctions and surface penetrations were carefully designed and planned to minimise both heat-loss and air-leakage (U-Value 0.10 W/m<sup>2</sup>·K)
- *Party Walls:* party walls were insulated with a build-up of 25 mm TW55 followed by the 12 mm OSB, then a further 25 mm thickness of TW55 finished with the plasterboard. The build-up was installed using adhesive rather than metal or plastic fixings, to further minimise thermal bridging (U-Value 0.27 W/m<sup>2</sup>·K)
- *Floors:* as part of the retrofit, the basement floor was first fitted with a ground-to-air heat exchanger. Above it an air-tight layer of OSB was installed, followed by 150 mm of PU insulation Kingspan Thermafloor TF70 (U-Value 0.14 W/m<sup>2</sup>·K)

### Renewables:

- Solar thermal system for hot water production



## Energy consumption

### Energy values:

- Air-tightness of 0.5 m<sup>3</sup>/hr/m<sup>2</sup> at 50 Pa
- 83 % reduction in CO<sub>2</sub> emissions and a 94 % cut in energy use
- The building's heating burden is now just 15 kWh of energy per m<sup>2</sup> per year (the UK average is 130 kWh per m<sup>2</sup> per year) – saving the tenants around £910 annually on fuel bills

- The house requires no gas boilers, radiators or conventional heating system, yet remains at a comfortable temperature with a healthy flow of air all year round

### Use of renewables:

- Most of hot water is provided by a high efficiency solar thermal system



## Awards won

- Passivhaus Certified



## Links

### Websites illustrating the building:

- [www.greenoctavia.org.uk/](http://www.greenoctavia.org.uk/) and [www.pauldavisandpartners.com/projects/residential/retrofit/](http://www.pauldavisandpartners.com/projects/residential/retrofit/)