



## **Building Energy Performance Ltd**

---

# **ENERGY EFFICIENCY REPORT in accordance with AD L1A 2014 (WALES) New Build Dwellings.**

---

for

**Plots 1-5 & 8-9,  
Troed Y Rhiw,  
Ystrad Mynach.**

**Building Energy Performance Ltd**

Unit 6  
St Mellons Business Park  
Fortran Road  
Cardiff  
CF3 0EY  
Tel: 029 20851111  
Fax: 029 20851522  
Email: [office@bepltd.co.uk](mailto:office@bepltd.co.uk)

**Prepared by:**

Kevin O'Donnell  
CEng BEng MCIBSE  
Code & Energy Assessor

# Contents

	<u>Page No:</u>
The Requirement	-3-
The Proposals	-3-
The Results	-5-
Observations	-5-
Appendix A – SAP Calculation Report Printouts	-6-

## The Requirement

Energy usage calculations have been carried out on the proposed new dwellings at Plots 1 & 2, Troed Y Rhiw, Ystrad Mynach using the approved energy efficiency calculation methodology of SAP 2012 as required under regulation 26 *“In accordance with the methodology approved by the Welsh Ministers in the Notice of Approval, the CO<sub>2</sub> emission rates for individual dwellings must be calculated using SAP 2012”* of Approved Document AD L1A of the Building Regulations (2014) Wales.

Paragraph 3.1.2 of AD L1A stipulates that in order to comply with current standards:

*“To comply with regulation 26 it will need to be demonstrated that the calculated Dwelling CO<sub>2</sub> Emission Rate (DER) does not exceed the Target CO<sub>2</sub> Emission Rate (TER).”*

Paragraph 4.2.1 of AD L1A states:

*“In order to demonstrate compliance with regulation 25C (b), the fabric performance values must be as good as or better than the worst acceptable values set out in Table 1.”*

Element	U-value
External walls	0.21 W/m <sup>2</sup> .k
Party walls	0.20 W/m <sup>2</sup> .k
Floor	0.18 W/m <sup>2</sup> .k
Roof	0.15 W/m <sup>2</sup> .k
Windows, roof windows curtain walling and pedestrian doors	1.60 W/m <sup>2</sup> .k

## The Proposals

The following building fabric and services proposals have been used in the energy model to limit the building's CO<sub>2</sub> emission rate to the required standards;

External Wall:	Timber frame wall: Face brick outer leaf, 50mm air space, timber frame inner leaf (build specification to be confirmed): U-value = 0.21W/m <sup>2</sup> K (assumed).
Ground Floor:	Suspended beam & block: 65mm screed, 75mm Kingspan K103 on 100mm concrete beam & block system: U-value = 0.17W/m <sup>2</sup> K.
Roof:	Plane roof: Tiles on timber battens, felt, loft space, 400mm mineral wool insulation (100mm between timber chords, 300mm cross laid over), 12.5mm plasterboard with skim finish: U-value = 0.10W/m <sup>2</sup> K (assumed).

Glazing:	Double glazed windows. U-value = 1.40W/m <sup>2</sup> K (assumed).
Doors:	External door. U-value = 1.40W/m <sup>2</sup> K (assumed).
Thermal Bridging:	Table K1 Accredited Construction Details used for Thermal Bridging & Air Tightness (assumed).
Air Permeability:	Semis: 4.65m <sup>3</sup> /(hr.m <sup>2</sup> ) at 50 Pascals building pressure difference. Detached: 10m <sup>3</sup> /(hr.m <sup>2</sup> ) at 50 Pascals building pressure difference.
Ventilation:	Local intermittent extract fans (Part F System 1) to kitchen and wet rooms.
Space Heating:	Mains gas fired Ideal Logic ESP1 30 (semi), 35 (detached) combi boiler with weather compensator controller. 1 zone (semis), 2 zone (detached) radiator central heating.
Hot Water:	Via the Ideal Logic ESP1 combi boiler.
Internal Lighting:	100% low energy lighting throughout.

## The Results

Adopting the proposals listed in the previous section provides the following results:

Do the building's CO <sub>2</sub> emissions comply with AD L1A?	<b>YES</b>
---	------------

A copy of the SAP 2012 summary results are included in Appendix A at the rear of this report for further information. SAP Reports for each individual dwelling have been issued under separate cover. An example report for a semi (plot 1) and detached dwelling (plot 3) have also been included at the rear of this report for further reference.

## Observations

Any assumptions made are listed in this report (refer to 'Proposals' section). Final details of any assumptions will need to be confirmed by the developer in due course so that the design stage SAP calculations can be updated and reviewed to ensure that Building Regulations compliance is still being achieved.

**APPENDIX – A**  
(SAP Calculation Report Printouts)



**Building Energy Performance Ltd**

---

**SAP Summary Table**

---

for

**Plots 1-5 & 8-9 Troed Y Rhiw,  
Ystrad Mynach,  
Caerphilly.**



**PLOTS 1-5 & 8-9 TROED Y RHIW, YSTRAD MYNACH, CAERPHILLY**  
**2014 SAP/BUILDING REGS COMPLIANCE CHECKS (15/07/19) Rev0**

<u>Plot #</u>	<u>Type/Style</u>	<u>Ori</u>	<u>SAP</u>	<u>TER</u>	<u>DER</u>	<u>%CO<sub>2</sub> Red'n</u>	<u>DAP</u>	<u>MAP</u>	<u>EPC I'ssd</u>	<u>Comments</u>
Plot 1	Semi-Detached	W	83B	19.00	19.00	-0.01	4.65			
Plot 2	Semi-Detached	W	83B	19.00	19.00	-0.01	4.65			
Plot 3	Detached	W	84B	16.51	16.45	0.38	10.0			
Plot 4	Detached	W	84B	16.51	16.45	0.38	10.0			
Plot 5	Detached	W	84B	16.51	16.45	0.38	10.0			
Plot 8	Detached	W	84B	16.51	16.45	0.38	10.0			
Plot 9	Detached	W	84B	16.51	16.45	0.38	10.0			

**Note: L1A 2014 Wales Building Regs.**

1. Specification developed and summarized below.
2. No secondary heating appliance.
3. 100% low energy lights.
4. U-Values used: Ground floor = 0.17W/m<sup>2</sup>K (65mm screed, 75mm Kingspan K103, DPM, beam & block type floors). External wall = 0.21W/m<sup>2</sup>K timber frame wall construction (details to be confirmed). Pitched roof = 0.10W/m<sup>2</sup>K (100+150+150mm mineral wool (0.040W/mK)), Windows/Patio Doors= 1.4W/m<sup>2</sup>K, Doors = 1.4W/m<sup>2</sup>K.
5. Air permeability = As listed in table. DAP = Design Air Permeability. MAP = Measured Air Permeability.
6. Boiler = Mains gas Ideal Logic ESP1 30/35 combi boiler. Radiator central heating with 1 zone heating (detached). Stat to have in-built delayed start function.
7. Ventilation via local mechanical extract fans (System 1).
8. Timber frame construction using Accredited Construction Details for Thermal Bridging & Air Tightness.
9. Party walls are sealed filled cavity walls (U = 0.0 W/m<sup>2</sup>K).

**Building Energy Performance Ltd contact details:**

Contact: **Kevin O'Donnell**  
 Tel: **(029) 20851111**  
 Mob: **(07949) 481191**  
 Email: [office@bep ltd.co.uk](mailto:office@bep ltd.co.uk)





**Building Energy Performance Ltd**

## SAP Report Submission for Building Regulations Compliance

Client: Emtrek Ltd

Project: Plot 1, Troed Y Rhiw  
Ystrad Mynach

Contact: Michael O'Donnell  
02920851111  
michael@bepltd.co.uk

Report Issue Date: 09/07/2019



# BASIC COMPLIANCE REPORT

## Calculation Type: New Build (As Designed)



<b>Property Reference</b>	plot1troedyrhiw		<b>Issued on Date</b>	09/07/2019	
<b>Assessment Reference</b>	001	<b>Prop Type Ref</b>	Semi Detached House		
<b>Property</b>	Plot 1, Troed Y Rhiw, Ystrad Mynach				
<b>SAP Rating</b>	83 B	<b>DER</b>	19.00	<b>TER</b>	19.00
<b>Environmental</b>	85 B	<b>% DER&lt;TER</b>	-0.01		
<b>CO<sub>2</sub> Emissions (t/year)</b>	1.34	<b>FEE</b>	49.54	<b>TFEE</b>	N/A
<b>General Requirements Compliance</b>	Pass	<b>% DFEE&lt;TFEE</b>	N/A		
<b>Assessor Details</b>	Mr. Joseph Goode, Joseph Goode, Tel: 02920 851111, joseph@bepltd.co.uk			<b>Assessor ID</b>	P634-0001
<b>Client</b>					

### SUMMARY FOR INPUT DATA FOR New Build (As Designed)

#### Criteria 1 – The DER must be no greater than the TER

##### 1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	19.00	kgCO <sub>2</sub> /m <sup>2</sup>	
Dwelling Carbon Dioxide Emission Rate (DER)	19.00	kgCO <sub>2</sub> /m <sup>2</sup>	Pass
	0.00 (0.0%)	kgCO <sub>2</sub> /m <sup>2</sup>	

#### Criteria 2 – Limits on design flexibility

##### Building Fabric

##### 2 Fabric U-values

Element	Average	Highest	
External wall	0.21 (max. 0.21)	0.21 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.17 (max. 0.18)	0.17 (max. 0.70)	Pass
Roof	0.10 (max. 0.15)	0.10 (max. 0.35)	Pass
Openings	1.40 (max. 1.60)	1.40 (max. 3.30)	Pass

##### 2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

##### 3 Air permeability

Air permeability at 50 pascals	4.65 (design value)	
Maximum	10.0	Pass

##### Fixed Building Services

##### 4 Heating efficiency

Main heating system	Boiler system with radiators or underfloor - Mains gas Data from database Ideal LOGIC COMBI ESP1 30 Combi boiler Efficiency: 89.6% SEDBUK2009 Minimum: 88.0%	Pass
Secondary heating system	None	

##### 5 Cylinder insulation

Hot water storage	No cylinder	
-------------------	-------------	--

# BASIC COMPLIANCE REPORT

## Calculation Type: New Build (As Designed)



### 6 Controls

Space heating controls	Programmer, room thermostat and TRVs	Pass
Hot water controls	No cylinder	
Boiler interlock	Yes	Pass

### 7 Low energy lights

Percentage of fixed lights with low-energy fittings	100	%	
Minimum	75	%	Pass

### 8 Mechanical ventilation

Not applicable

## Criterion 3 – Limiting overheating due to solar and other gains

### 9 Summertime temperature

Overheating risk (Severn (Wales))	Not significant	Pass
Based on:		
Overshading	Average	
Windows facing East	3.29 m <sup>2</sup> , No overhang	
Windows facing West	3.96 m <sup>2</sup> , No overhang	
Air change rate	4.00 ach	
Blinds/curtains	None	

## Criterion 4 – Building performance consistent with DER

### Party Walls

Type	U-value	W/m <sup>2</sup> K	
Filled Cavity with Edge Sealing	0.00		Pass

### Air-pressure testing

#### 3 Air permeability

Air permeability at 50 pascals	4.65 (design value)	
Maximum	10.0	Pass

### 10 Key features

Roof U-value	0.10	W/m <sup>2</sup> K
Air permeability	4.7	m <sup>3</sup> /m <sup>2</sup> h

*This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.*

# SUMMARY FOR INPUT DATA

## Calculation Type: New Build (As Designed)



Property Reference	plot1troedyrhiw		Issued on Date	09/07/2019	
Assessment Reference	001	Prop Type Ref	Semi Detached House		
Property	Plot 1, Troed Y Rhiw, Ystrad Mynach				
SAP Rating	83 B	DER	19.00	TER	19.00
Environmental	85 B	% DER<TER	-0.01		
CO <sub>2</sub> Emissions (t/year)	1.34	FEE	49.54	TFEE	N/A
General Requirements Compliance	Pass	% DFEE<TFEE	N/A		
Assessor Details	Mr. Joseph Goode, Joseph Goode, Tel: 02920 851111, joseph@bepltd.co.uk			Assessor ID	P634-0001
Client					

### SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	West
Property Tenure	Unknown
Transaction Type	New dwelling
Terrain Type	Suburban
1.0 Property Type	House, Semi-Detached
2.0 Number of Storeys	2
3.0 Date Built	2019
4.0 Sheltered Sides	1
5.0 Sunlight/Shade	Average or unknown

#### 6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	18.20 m	39.96 m <sup>2</sup>	2.60 m
1st Storey:	18.20 m	39.96 m <sup>2</sup>	2.40 m

7.0 Living Area  m<sup>2</sup>

8.0 Thermal Mass Parameter  
 Thermal Mass   
 kJ/m<sup>2</sup>K

#### 9.0 External Walls

Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Gross Area (m <sup>2</sup> )	Nett Area (m <sup>2</sup> )
External Wall 1	Timber Frame	Timber framed wall (one layer of plasterboard)	0.21	9.00	91.00	79.93

#### 9.1 Party Walls

Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
Party Wall 1	Filled Cavity with Edge Sealing	Double plasterboard on both sides, twin timber f rame with/without sheathing board	0.00	20.00	37.00

#### 9.2 Internal Walls

Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
Internal Wall 1	Plasterboard on timber frame	9.00	156.48

#### 10.0 External Roofs

Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Gross Area (m <sup>2</sup> )	Nett Area (m <sup>2</sup> )
External Roof 1	External Plane Roof	Plasterboard, insulated at ceiling level	0.10	9.00	39.96	39.96

#### 10.2 Internal Ceilings

# SUMMARY FOR INPUT DATA

## Calculation Type: New Build (As Designed)



Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
Internal Ceiling 1	Plasterboard ceiling, carpeted chipboard floor	9.00	39.96

  

11.0 Heat Loss Floors					
Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
Heat Loss Floor 1	Ground Floor - Solid	Suspended concrete floor, carpeted	0.17	75.00	39.96

  

11.2 Internal Floors					
Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )		
Internal Floor 1	Plasterboard ceiling, carpeted chipboard floor	18.00	39.96		

  

12.0 Opening Types										
Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m <sup>2</sup> K)	
Half Glazed Door	Manufacturer	Half Glazed Door	Double Low-E Soft 0.05			0.63		0.70	1.40	
Window	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.40	

  

13.0 Openings											
Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m <sup>2</sup> )	Curtain Closed
Front	Half Glazed Door	[1] External Wall 1	West							1.91	
Front	Window	[1] External Wall 1	West	None	0.00					3.96	
Rear	Half Glazed Door	[1] External Wall 1	East							1.91	
Rear	Window	[1] External Wall 1	East	None	0.00					3.29	

  

14.0 Conservatory	<input type="text" value="None"/>
15.0 Draught Proofing	<input type="text" value="100"/> %
16.0 Draught Lobby	<input type="text" value="No"/>
17.0 Thermal Bridging	<input type="text" value="Calculate Bridges"/>

  

17.1 List of Bridges					
Source Type	Bridge Type	Length	Psi	Imported	
Table K1 - Approved	E1 Steel lintel with perforated steel base plate	7.92	0.500	Yes	
Table K1 - Approved	E3 Sill	6.10	0.040	Yes	
Table K1 - Approved	E4 Jamb	24.90	0.050	Yes	
Table K1 - Approved	E5 Ground floor (normal)	18.20	0.160	Yes	
Table K1 - Approved	E6 Intermediate floor within a dwelling	18.20	0.070	Yes	
Table K1 - Approved	E10 Eaves (insulation at ceiling level)	10.80	0.060	No	
Table K1 - Approved	E12 Gable (insulation at ceiling level)	7.40	0.240	No	
Table K1 - Approved	E16 Corner (normal)	10.00	0.090	Yes	
Table K1 - Approved	E18 Party wall between dwellings	10.00	0.060	Yes	
Table K1 - Default	P1 Party wall - Ground floor	7.40	0.160	No	
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	7.40	0.000	No	
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	7.40	0.240	No	

  

Y-value	<input type="text" value="0.097"/>	W/m <sup>2</sup> K
---------	------------------------------------	--------------------

  

18.0 Pressure Testing		
Designed AP <sub>50</sub>	<input type="text" value="Yes"/>	
Property Tested ?	<input type="text" value="4.65"/>	m <sup>3</sup> /(h.m <sup>2</sup> ) @ 50 Pa
As Built AP <sub>50</sub>	<input type="text"/>	m <sup>3</sup> /(h.m <sup>2</sup> ) @ 50 Pa

  

19.0 Mechanical Ventilation	
Summer Overheating	
Windows open in hot weather	<input type="text" value="Windows half open"/>

# SUMMARY FOR INPUT DATA

## Calculation Type: New Build (As Designed)



Cross ventilation possible   
Night Ventilation   
Air change rate

### Mechanical Ventilation

Mechanical Ventilation System Present

### 20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				3
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

### 22.0 Lighting

#### Internal

Total number of light fittings   
Total number of L.E.L. fittings   
Percentage of L.E.L. fittings  %

#### External

External lights fitted

23.0 Electricity Tariff

24.0 Main Heating 1

Percentage of Heat  %  
Database Ref. No.   
Fuel Type   
Main Heating   
SAP Code   
In Winter   
In Summer   
Controls   
PCDF Controls   
Delayed Start Stat   
Sap Code   
Boiler Compensator   
Flue Type   
Fan Assisted Flue   
Is MHS Pumped   
Heat Emitter   
Flow Temperature   
Combi boiler type   
Combi keep hot type

25.0 Main Heating 2

Community Heating

28.0 Water Heating

# SUMMARY FOR INPUT DATA

## Calculation Type: New Build (As Designed)



Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	901

29.0 Hot Water Cylinder	None
-------------------------	------

### Recommendations

#### Lower cost measures

None

#### Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating	£4,000 - £6,000	£29	B 84	
	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar photovoltaic panels, 2.5 kWp	£3,500 - £5,500	£320	A 95	

# THERMAL BRIDGING

## Calculation Type: New Build (As Designed)



Property Reference	plot1troedyrhiw		Issued on Date	09/07/2019	
Assessment Reference	001	Prop Type Ref	Semi Detached House		
Property	Plot 1, Troed Y Rhiw, Ystrad Mynach				
SAP Rating	83 B	DER	19.00	TER	19.00
Environmental	85 B	% DER<TER	-0.01		
CO <sub>2</sub> Emissions (t/year)	1.34	FEE	49.54	TFEE	N/A
General Requirements Compliance	Pass	% DFEE<TFEE	N/A		
Assessor Details	Mr. Joseph Goode, Joseph Goode, Tel: 02920 851111, joseph@bepltd.co.uk			Assessor ID	P634-0001
Client					

	Junction detail	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Table K1 - Approved	0.500	7.92	3.96	
External wall	E3 Sill	Table K1 - Approved	0.040	6.10	0.24	
External wall	E4 Jamb	Table K1 - Approved	0.050	24.90	1.25	
External wall	E5 Ground floor (normal)	Table K1 - Approved	0.160	18.20	2.91	
External wall	E6 Intermediate floor within a dwelling	Table K1 - Approved	0.070	18.20	1.27	
External wall	E10 Eaves (insulation at ceiling level)	Table K1 - Approved	0.060	10.80	0.65	
External wall	E12 Gable (insulation at ceiling level)	Table K1 - Approved	0.240	7.40	1.78	
External wall	E16 Corner (normal)	Table K1 - Approved	0.090	10.00	0.90	
External wall	E18 Party wall between dwellings	Table K1 - Approved	0.060	10.00	0.60	
Party wall	P1 Party wall - Ground floor	Table K1 - Default	0.160	7.40	1.18	
Party wall	P2 Party wall - Intermediate floor within a dwelling	Table K1 - Default	0.000	7.40	0.00	
Party wall	P4 Party wall - Roof (insulation at ceiling level)	Table K1 - Default	0.240	7.40	1.78	

Total: **16.52** W/mK:  
 Y-Value: **0.097** W/m<sup>2</sup>K:



# U-VALUE CALCULATOR REPORT



Property Reference	plot1troedyrhiw		Issued on Date	09/07/2019
Assessment Reference	001	Prop Type Ref	Semi Detached House	
Project	Plot 1, Troed Y Rhiw, Ystrad Mynach			
Calculation Type	New Build (As Designed)			

SAP Rating	83 B	DER	19.00	TER	19.00
Environmental	85 B	% DER<TER	-0.01		
CO <sub>2</sub> Emissions (t/year)	1.34	FEE	49.54	TFEE	N/A
General Requirements Compliance	Pass	% DFEE<TFEE	N/A		

Assessor Details	Mr. Joseph Goode, Joseph Goode, Tel: 02920 851111, joseph@bepltd.co.uk	Assessor ID	P634-0001
Client			

## Building Elements

### Roof 000001

#### Roof Type: Pitched Roof, insulated flat ceiling

Layer	Description	Thickness (mm)	Conductivity (W/m <sup>2</sup> K)	Resistance (m <sup>2</sup> K/W)	Fraction (%)
Ext surface				0.0346	
Layer 1	<b>Tiling, concrete</b>				
	Main construction	20	1.5000	0.0115	100.00
Layer 2	<b>airspace/timber battens</b>				
	Main construction	25	0.0000	0.0000	89.63
	Main construction	25	0.1563	0.1386	10.37
	Corrections - Cavity Ventilated, Emissivity: Normal				
Layer 3	<b>Sarking felt</b>				
	Main construction	1	0.2300	0.0038	100.00
Layer 4	<b>Loft Space</b>				
	Main construction	0	0.2000	0.2000	100.00
Layer 5	<b>Glassfibre</b>				
	Main construction	150	0.0400	3.7500	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 6	<b>Glassfibre</b>				
	Main construction	150	0.0400	3.7500	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 7	<b>Glassfibre</b>				
	Main construction	100	0.0400	2.5000	93.67
	Main construction	100	0.1300	0.7692	6.33
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 8	<b>Gyproc Wallboard (12.5mm)</b>				
	Main construction	12.5	0.1900	0.0658	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 9	<b>Plaster, standard</b>				
	Main construction	3	0.4000	0.0075	100.00
Int surface				0.1000	

<b>Total resistance:</b>	<b>Upper limit =</b> 10.308 m <sup>2</sup> K/W	<b>Lower limit =</b> 11.447 m <sup>2</sup> K/W	<b>Average =</b> 10.877 m <sup>2</sup> K/W
	<b>Total correction =</b> 0.0058 m <sup>2</sup> K/W	<b>U-value (unrounded) =</b> 0.1 W/m <sup>2</sup> K	

# U-VALUE CALCULATOR REPORT



Unheated space: None

Total thickness: 462 mm

U-value: 0.10 W/m<sup>2</sup> K

Kappa: n/a

# U-VALUE CALCULATOR REPORT



Property Reference	plot1troedyrhiw		Issued on Date	09/07/2019
Assessment Reference	001	Prop Type Ref	Semi Detached House	
Project	Plot 1, Troed Y Rhiw, Ystrad Mynach			
Calculation Type	New Build (As Designed)			

SAP Rating	83 B	DER	19.00	TER	19.00
Environmental	85 B	% DER<TER	-0.01		
CO <sub>2</sub> Emissions (t/year)	1.34	FEE	49.54	TFEE	N/A
General Requirements Compliance	Pass	% DFEE<TFEE	N/A		

Assessor Details	Mr. Joseph Goode, Joseph Goode, Tel: 02920 851111, joseph@bepltd.co.uk	Assessor ID	P634-0001
Client			

## Building Elements

### Floor 000002

Floor Type: Suspended Floor

Area = 39.96 m<sup>2</sup>, Perimeter = 18.20 m, Wall thickness = 328.00 mm, Soil: Unknown

Depth of underfloor space below ground: 0.200 m Floor wind shielding: Average (suburban)

Floor height above ground: h = 0.200 m

U-value of walls above ground: U<sub>w</sub> = 0.210 m

Ventilation openings per perimeter length: e = 0.0015 %

Mean wind speed: v = 5.000 m/s

Resistance on solum: R<sub>g</sub> = 0.000 m<sup>2</sup>K/W

Layer	Description	Thickness (mm)	Conductivity (W/m <sup>2</sup> K)	Resistance (m <sup>2</sup> K/W)	Fraction (%)
Ext surface				0.1700	
Layer 1	<b>Concrete, dense</b> Main construction	100	2.0000	0.0500	100.00
Layer 2	<b>Kingspan K103</b> Main construction Corrections - Air Gap: Level 1, Fasteners: None or plastic	75	0.0180	4.1667	100.00
Layer 3	<b>Screed</b> Main construction	65	1.1500	0.0565	100.00
Int surface				0.1700	

Total resistance: Upper limit = 4.613 m<sup>2</sup> K/W Lower limit = 4.613 m<sup>2</sup> K/W Average = 4.613 m<sup>2</sup> K/W

Total correction = 0.0082 m<sup>2</sup> K/W

U-value (unrounded) = 0.17 W/m<sup>2</sup> K

Unheated space: None

Total thickness:	240 mm	U-value: 0.17 W/m <sup>2</sup> K	Kappa: n/a
------------------	--------	----------------------------------	------------



**Building Energy Performance Ltd**

## SAP Report Submission for Building Regulations Compliance

Client: Emtrek Ltd

Project: Plot 3, Troed Y Rhiw  
Ystrad Mynach

Contact: Michael O'Donnell  
Michael O'Donnell  
michael@bepltd.co.uk

Report Issue Date: 09/07/2019



# BASIC COMPLIANCE REPORT

## Calculation Type: New Build (As Designed)



<b>Property Reference</b>	plot3troedyrhiw	<b>Issued on Date</b>	09/07/2019
<b>Assessment Reference</b>	001	<b>Prop Type Ref</b>	Detached House
<b>Property</b>	Plot 3, Troed Y Rhiw, Ystrad Mynach		

<b>SAP Rating</b>	84 B	<b>DER</b>	16.45	<b>TER</b>	16.51
<b>Environmental</b>	84 B	<b>% DER&lt;TER</b>	0.38		
<b>CO<sub>2</sub> Emissions (t/year)</b>	2.32	<b>FEE</b>	60.13	<b>TFEE</b>	N/A
<b>General Requirements Compliance</b>	Pass	<b>% DFEE&lt;TFEE</b>	N/A		

<b>Assessor Details</b>	Mr. Kevin O'Donnell, Building Energy Performance Limited, Tel: 029 2085 1111, kevin@bepltd.co.uk	<b>Assessor ID</b>	P634-0001
-------------------------	--	--------------------	-----------

<b>Client</b>	
---------------	--

### SUMMARY FOR INPUT DATA FOR New Build (As Designed)

#### Criteria 1 – The DER must be no greater than the TER

##### 1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	16.51	kgCO <sub>2</sub> /m <sup>2</sup>	
Dwelling Carbon Dioxide Emission Rate (DER)	16.45	kgCO <sub>2</sub> /m <sup>2</sup>	Pass
	-0.06 (-0.4%)	kgCO <sub>2</sub> /m <sup>2</sup>	

#### Criteria 2 – Limits on design flexibility

##### Building Fabric

##### 2 Fabric U-values

Element	Average	Highest	
External wall	0.21 (max. 0.21)	0.21 (max. 0.70)	Pass
Floor	0.17 (max. 0.18)	0.17 (max. 0.70)	Pass
Roof	0.10 (max. 0.15)	0.10 (max. 0.35)	Pass
Openings	1.40 (max. 1.60)	1.40 (max. 3.30)	Pass

##### 2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

##### 3 Air permeability

Air permeability at 50 pascals	10.00 (design value)	
Maximum	10.0	Pass

##### Fixed Building Services

##### 4 Heating efficiency

Main heating system	Boiler system with radiators or underfloor - Mains gas Data from database Ideal LOGIC COMBI ESP1 35 Combi boiler Efficiency: 89.6% SEDBUK2009 Minimum: 88.0%	Pass
Secondary heating system	None	

##### 5 Cylinder insulation

Hot water storage	No cylinder	
-------------------	-------------	--

# BASIC COMPLIANCE REPORT

## Calculation Type: New Build (As Designed)



### 6 Controls

Space heating controls	Time and temperature zone control	Pass
Hot water controls	No cylinder	
Boiler interlock	Yes	Pass

### 7 Low energy lights

Percentage of fixed lights with low-energy fittings	100	%	
Minimum	75	%	Pass

### 8 Mechanical ventilation

Not applicable

## Criterion 3 – Limiting overheating due to solar and other gains

### 9 Summertime temperature

Overheating risk (Severn (Wales))	Slight	Pass
Based on:		
Overshading	Average	
Windows facing North	4.35 m <sup>2</sup> , No overhang	
Windows facing East	15.26 m <sup>2</sup> , No overhang	
Windows facing South	4.35 m <sup>2</sup> , No overhang	
Windows facing West	13.57 m <sup>2</sup> , No overhang	
Air change rate	4.00 ach	
Blinds/curtains	None	

## Criterion 4 – Building performance consistent with DER

### Air-pressure testing

#### 3 Air permeability

Air permeability at 50 pascals	10.00 (design value)	
Maximum	10.0	Pass

### 10 Key features

Roof U-value	0.10	W/m <sup>2</sup> K
--------------	------	--------------------

*This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.*

# SUMMARY FOR INPUT DATA

## Calculation Type: New Build (As Designed)



Property Reference	plot3troedyrhiw		Issued on Date	09/07/2019	
Assessment Reference	001	Prop Type Ref	Detached House		
Property	Plot 3, Troed Y Rhiw, Ystrad Mynach				
SAP Rating	84 B	DER	16.45	TER	16.51
Environmental	84 B	% DER<TER	0.38		
CO <sub>2</sub> Emissions (t/year)	2.32	FEE	60.13	TFEE	N/A
General Requirements Compliance	Pass	% DFEE<TFEE	N/A		
Assessor Details	Mr. Kevin O'Donnell, Building Energy Performance Limited, Tel: 029 2085 1111, kevin@bepltd.co.uk			Assessor ID	P634-0001
Client					

### SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	West
Property Tenure	Unknown
Transaction Type	New dwelling
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	2
3.0 Date Built	2019
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

#### 6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	43.97 m	76.76 m <sup>2</sup>	2.40 m
1st Storey:	37.21 m	78.80 m <sup>2</sup>	2.60 m

7.0 Living Area  m<sup>2</sup>

8.0 Thermal Mass Parameter  
 Thermal Mass   
 kJ/m<sup>2</sup>K

#### 9.0 External Walls

Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Gross Area (m <sup>2</sup> )	Nett Area (m <sup>2</sup> )
External Wall 1	Timber Frame	Timber framed wall (one layer of plasterboard)	0.21	9.00	183.00	141.65
Garage	Timber Frame	Timber framed wall (one layer of plasterboard)	0.21	9.00	20.87	20.87

#### 9.2 Internal Walls

Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
Internal Wall 1	Plasterboard on timber frame	9.00	246.48

#### 10.0 External Roofs

Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Gross Area (m <sup>2</sup> )	Nett Area (m <sup>2</sup> )
External Roof 1	External Plane Roof	Plasterboard, insulated at ceiling level	0.10	9.00	78.80	78.80

#### 10.2 Internal Ceilings

Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
Internal Ceiling 1	Plasterboard ceiling, carpeted chipboard floor	9.00	62.91

#### 11.0 Heat Loss Floors

# SUMMARY FOR INPUT DATA

## Calculation Type: New Build (As Designed)



Description	Type	Construction	U-Value (W/m <sup>2</sup> K)	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
Heat Loss Floor 1	Ground Floor - Solid	Suspended concrete floor, carpeted	0.17	75.00	76.76
Garage	Exposed Floor - Timber	Timber exposed floor, insulation between joists	0.19	20.00	15.86

### 11.2 Internal Floors

Description	Construction	Kappa (kJ/m <sup>2</sup> K)	Area (m <sup>2</sup> )
Internal Floor 1	Plasterboard ceiling, carpeted chipboard floor	18.00	62.91

### 12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m <sup>2</sup> K)
Half Glazed Door	Manufacturer	Half Glazed Door	Double Low-E Soft 0.05			0.63		0.70	1.40
Window	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.40

### 13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m <sup>2</sup> )	Curtain Closed
Front	Half Glazed Door	[1] External Wall 1	West							1.91	
Front	Window	[1] External Wall 1	West	None	0.00					13.57	
Rear	Half Glazed Door	[1] External Wall 1	East							1.91	
Rear	Window	[1] External Wall 1	East	None	0.00					15.26	
Side	Window	[1] External Wall 1	North	None	0.00					4.35	
Side	Window	[1] External Wall 1	South	None	0.00					4.35	

### 14.0 Conservatory

### 15.0 Draught Proofing

 %

### 16.0 Draught Lobby

### 17.0 Thermal Bridging

### 17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Table K1 - Approved	E1 Steel lintel with perforated steel base plate	29.73	0.500	No
Table K1 - Approved	E3 Sill	27.91	0.040	No
Table K1 - Approved	E4 Jamb	55.50	0.050	No
Table K1 - Approved	E5 Ground floor (normal)	55.50	0.160	No
Table K1 - Default	E21 Exposed floor (inverted)	8.03	0.320	No
Table K1 - Approved	E6 Intermediate floor within a dwelling	43.97	0.070	No
Table K1 - Approved	E10 Eaves (insulation at ceiling level)	43.97	0.060	No
Table K1 - Approved	E16 Corner (normal)	22.60	0.090	No
Table K1 - Approved	E17 Corner (inverted – internal area greater than external area)	15.00	-0.090	No

Y-value  W/m<sup>2</sup>K

### 18.0 Pressure Testing

Designed AP<sub>50</sub>  m<sup>3</sup>/(h.m<sup>2</sup>) @ 50 Pa

Property Tested ?

As Built AP<sub>50</sub>  m<sup>3</sup>/(h.m<sup>2</sup>) @ 50 Pa

### 19.0 Mechanical Ventilation

#### Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate



# SUMMARY FOR INPUT DATA

## Calculation Type: New Build (As Designed)



### Mechanical Ventilation

Mechanical Ventilation System Present

### 20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				5
Number of passive vents				0
Number of flueless gas fires				0

### 21.0 Fixed Cooling System

### 22.0 Lighting

#### Internal

Total number of light fittings	<input type="text" value="14"/>	
Total number of L.E.L. fittings	<input type="text" value="14"/>	
Percentage of L.E.L. fittings	<input type="text" value="100.00"/>	%

#### External

External lights fitted

### 23.0 Electricity Tariff

### 24.0 Main Heating 1

Percentage of Heat	<input type="text" value="100"/>	%
Database Ref. No.	<input type="text" value="17929"/>	
Fuel Type	<input type="text" value="Mains gas"/>	
Main Heating	<input type="text" value="BGW"/>	
SAP Code	<input type="text" value="104"/>	
In Winter	<input type="text" value="90.5"/>	
In Summer	<input type="text" value="87.3"/>	
Controls	<input type="text" value="CBI Time and temperature zone control"/>	
PCDF Controls	<input type="text" value="0"/>	
Delayed Start Stat	<input type="text" value="No"/>	
Sap Code	<input type="text" value="2110"/>	
Boiler Compensator	<input type="text" value="Ideal Boilers, Ideal, PRT3"/>	
Flue Type	<input type="text" value="Balanced"/>	
Fan Assisted Flue	<input type="text" value="Yes"/>	
Is MHS Pumped	<input type="text" value="Pump in heated space"/>	
Heat Emitter	<input type="text" value="Radiators"/>	
Flow Temperature	<input type="text" value="Normal (&gt; 45°C)"/>	
Combi boiler type	<input type="text" value="Standard Combi"/>	
Combi keep hot type	<input type="text" value="None"/>	

### 25.0 Main Heating 2

Community Heating

### 28.0 Water Heating

Water Heating	<input type="text" value="HWP From main heating 1"/>
Flue Gas Heat Recovery System	<input type="text" value="Main Heating 1"/>
Waste Water Heat Recovery	<input type="text" value="No"/>
	<input type="text" value="No"/>

# SUMMARY FOR INPUT DATA

## Calculation Type: New Build (As Designed)



Instantaneous System 1	
Waste Water Heat Recovery	<input type="text" value="No"/>
Instantaneous System 2	
Waste Water Heat Recovery	<input type="text" value="No"/>
Storage System	
Solar Panel	<input type="text" value="No"/>
Water use <= 125 litres/person/day	<input type="text" value="Yes"/>
SAP Code	<input type="text" value="901"/>

---

29.0 Hot Water Cylinder	<input type="text" value="None"/>
-------------------------	-----------------------------------

---

### Recommendations

#### Lower cost measures

None

#### Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar photovoltaic panels, 2.5 kWp	£3,500 - £5,500	£320	B 91	

# THERMAL BRIDGING

## Calculation Type: New Build (As Designed)



Property Reference	plot3troedyrhiw		Issued on Date	09/07/2019	
Assessment Reference	001	Prop Type Ref	Detached House		
Property	Plot 3, Troed Y Rhiw, Ystrad Mynach				
SAP Rating	84 B	DER	16.45	TER	16.51
Environmental	84 B	% DER<TER	0.38		
CO <sub>2</sub> Emissions (t/year)	2.32	FEE	60.13	TFEE	N/A
General Requirements Compliance	Pass	% DFEE<TFEE	N/A		
Assessor Details	Mr. Kevin O'Donnell, Building Energy Performance Limited, Tel: 029 2085 1111, kevin@bepltd.co.uk			Assessor ID	P634-0001
Client					

	Junction detail	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Table K1 - Approved	0.500	29.73	14.87	
External wall	E3 Sill	Table K1 - Approved	0.040	27.91	1.12	
External wall	E4 Jamb	Table K1 - Approved	0.050	55.50	2.78	
External wall	E5 Ground floor (normal)	Table K1 - Approved	0.160	55.50	8.88	
External wall	E21 Exposed floor (inverted)	Table K1 - Default	0.320	8.03	2.57	
External wall	E6 Intermediate floor within a dwelling	Table K1 - Approved	0.070	43.97	3.08	
External wall	E10 Eaves (insulation at ceiling level)	Table K1 - Approved	0.060	43.97	2.64	
External wall	E16 Corner (normal)	Table K1 - Approved	0.090	22.60	2.03	
External wall	E17 Corner (inverted – internal area greater than external area)	Table K1 - Approved	-0.090	15.00	-1.35	

Total: **36.61** W/mK:  
 Y-Value: **0.098** W/m<sup>2</sup>K:

# U-VALUE CALCULATOR REPORT



Property Reference	plot3troedyrhiw		Issued on Date	09/07/2019
Assessment Reference	001	Prop Type Ref	Detached House	
Project	Plot 3, Troed Y Rhiw, Ystrad Mynach			
Calculation Type	New Build (As Designed)			

SAP Rating	84 B	DER	16.45	TER	16.51
Environmental	84 B	% DER<TER	0.38		
CO <sub>2</sub> Emissions (t/year)	2.32	FEE	60.13	TFEE	N/A
General Requirements Compliance	Pass	% DFEE<TFEE	N/A		

Assessor Details	Mr. Kevin O'Donnell, Building Energy Performance Limited, Tel: 029 2085 1111, kevin@bepltd.co.uk	Assessor ID	P634-0001
Client			

## Building Elements

### Roof 000001

#### Roof Type: Pitched Roof, insulated flat ceiling

Layer	Description	Thickness (mm)	Conductivity (W/m <sup>2</sup> K)	Resistance (m <sup>2</sup> K/W)	Fraction (%)
Ext surface				0.0346	
Layer 1	<b>Tiling, concrete</b>				
	Main construction	20	1.5000	0.0115	100.00
Layer 2	<b>airspace/timber battens</b>				
	Main construction	25	0.0000	0.0000	89.63
	Main construction	25	0.1563	0.1386	10.37
	Corrections - Cavity Ventilated, Emissivity: Normal				
Layer 3	<b>Sarking felt</b>				
	Main construction	1	0.2300	0.0038	100.00
Layer 4	<b>Loft Space</b>				
	Main construction	0	0.2000	0.2000	100.00
Layer 5	<b>Glassfibre</b>				
	Main construction	150	0.0400	3.7500	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 6	<b>Glassfibre</b>				
	Main construction	150	0.0400	3.7500	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 7	<b>Glassfibre</b>				
	Main construction	100	0.0400	2.5000	93.67
	Main construction	100	0.1300	0.7692	6.33
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 8	<b>Gyproc Wallboard (12.5mm)</b>				
	Main construction	12.5	0.1900	0.0658	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 9	<b>Plaster, standard</b>				
	Main construction	3	0.4000	0.0075	100.00
Int surface				0.1000	

**Total resistance:** Upper limit = 10.308 m<sup>2</sup> K/W      Lower limit = 11.447 m<sup>2</sup> K/W      Average = 10.877 m<sup>2</sup> K/W  
 Total correction = 0.0058 m<sup>2</sup> K/W      U-value (unrounded) = 0.1 W/m<sup>2</sup> K

# U-VALUE CALCULATOR REPORT



Unheated space: None

Total thickness: 462 mm

U-value: 0.10 W/m<sup>2</sup> K

Kappa: n/a

# U-VALUE CALCULATOR REPORT



Property Reference	plot3troedyrhiw		Issued on Date	09/07/2019
Assessment Reference	001	Prop Type Ref	Detached House	
Project	Plot 3, Troed Y Rhiw, Ystrad Mynach			
Calculation Type	New Build (As Designed)			

SAP Rating	84 B	DER	16.45	TER	16.51
Environmental	84 B	% DER<TER	0.38		
CO <sub>2</sub> Emissions (t/year)	2.32	FEE	60.13	TFEE	N/A
General Requirements Compliance	Pass	% DFEE<TFEE	N/A		

Assessor Details	Mr. Kevin O'Donnell, Building Energy Performance Limited, Tel: 029 2085 1111, kevin@bepltd.co.uk	Assessor ID	P634-0001
------------------	--	-------------	-----------

Client	
--------	--

## Building Elements

### Floor 000002

Floor Type: Suspended Floor

Area = 39.96 m<sup>2</sup>, Perimeter = 18.20 m, Wall thickness = 328.00 mm, Soil: Unknown

Depth of underfloor space below ground: 0.200 m Floor wind shielding: Average (suburban)

Floor height above ground: h = 0.200 m

U-value of walls above ground: U<sub>w</sub> = 0.210 m

Ventilation openings per perimeter length: e = 0.0015 %

Mean wind speed: v = 5.000 m/s

Resistance on solum: R<sub>g</sub> = 0.000 m<sup>2</sup>K/W

Layer	Description	Thickness (mm)	Conductivity (W/m <sup>2</sup> K)	Resistance (m <sup>2</sup> K/W)	Fraction (%)
Ext surface				0.1700	
Layer 1	<b>Concrete, dense</b> Main construction	100	2.0000	0.0500	100.00
Layer 2	<b>Kingspan K103</b> Main construction Corrections - Air Gap: Level 1, Fasteners: None or plastic	75	0.0180	4.1667	100.00
Layer 3	<b>Screed</b> Main construction	65	1.1500	0.0565	100.00
Int surface				0.1700	

Total resistance: Upper limit = 4.613 m<sup>2</sup> K/W Lower limit = 4.613 m<sup>2</sup> K/W Average = 4.613 m<sup>2</sup> K/W

Total correction = 0.0082 m<sup>2</sup> K/W

U-value (unrounded) = 0.17 W/m<sup>2</sup> K

Unheated space: None

Total thickness:	240 mm	U-value: 0.17 W/m <sup>2</sup> K	Kappa: n/a
------------------	--------	----------------------------------	------------

# U-VALUE CALCULATOR REPORT



Property Reference	plot3troedyrhiw	Issued on Date	09/07/2019
Assessment Reference	001	Prop Type Ref	Detached House
Project	Plot 3, Troed Y Rhiw, Ystrad Mynach		
Calculation Type	New Build (As Designed)		

SAP Rating	84 B	DER	16.45	TER	16.51
Environmental	84 B	% DER<TER	0.38		
CO <sub>2</sub> Emissions (t/year)	2.32	FEE	60.13	TFEE	N/A
General Requirements Compliance	Pass	% DFEE<TFEE	N/A		

Assessor Details	Mr. Kevin O'Donnell, Building Energy Performance Limited, Tel: 029 2085 1111, kevin@bepltd.co.uk	Assessor ID	P634-0001
------------------	--	-------------	-----------

Client	
--------	--

## Building Elements

### Floor 000003

Floor Type: Exposed Floor

Layer	Description	Thickness (mm)	Conductivity (W/m <sup>2</sup> K)	Resistance (m <sup>2</sup> K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	<b>Plaster, standard</b>				
	Main construction	3	0.4000	0.0075	100.00
Layer 2	<b>Plasterboard, standard</b>				
	Main construction	12.5	0.2100	0.0595	100.00
Layer 3	<b>Plasterboard, standard</b>				
	Main construction	12.5	0.2100	0.0595	100.00
Layer 4	<b>Glassfibre</b>				
	Main construction	250	0.0400	6.2500	89.00
	Main construction	250	0.1300	1.9231	11.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 5	<b>Orientated Strand Board</b>				
	Main construction	18	0.1300	0.1385	100.00
Int surface				0.1700	

Total resistance: Upper limit = 5.611 m<sup>2</sup> K/W Lower limit = 5.485 m<sup>2</sup> K/W Average = 5.548 m<sup>2</sup> K/W  
 Total correction = 0.0082 m<sup>2</sup> K/W U-value (unrounded) = 0.19 W/m<sup>2</sup> K

Unheated space:	None		
Total thickness:	296 mm	U-value: 0.19 W/m <sup>2</sup> K	Kappa: n/a