

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

Prepared by:

Kevin O'Donnell CEng BEng MCIBSE Code & Energy Assessor

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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 CO₂ 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_2 Emission Rate (DER) does not exceed the Target CO_2 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."

Table 1: Worst acceptable fabric performance val	ues
Element	U-value
External walls	0.21 W/m ² .k
Party walls	0.20 W/m ² .k
Floor	0.18 W/m ² .k
Roof	0.15 W/m ² .k
Windows, roof windows curtain walling and pedestrian doors	1.60 W/m ² .k

The Proposals

The following building fabric and services proposals have been used in the energy model to limit the building's CO₂ 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 =

 $0.21W/m^2K$ (assumed).

Ground Floor: Suspended beam & block: 65mm screed, 75mm Kingspan K103 on

100mm concrete beam & block system: U-value = 0.17W/m²K.

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/m²K

(assumed).

Glazing: Double glazed windows. U-value = 1.40W/m²K (assumed).

Doors: External door. U-value = 1.40W/m²K (assumed).

Thermal Bridging: Table K1 Accredited Construction Details used for Thermal Bridging &

Air Tightness (assumed).

Air Permeability: Semis: 4.65m³/(hr.m²) at 50 Pascals building pressure difference.

Detached: 10m³/(hr.m²) 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 CO₂ emissions comply with AD L1A?

YES

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)



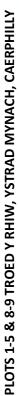
Building Energy Performance Ltd

SAP Summary Table

for

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

Caerphilly.



2014 SAP/BUILDING REGS COMPLIANCE CHECKS (15/07/19) Rev0



Type/Style Ori SAP	SAP	SAP		TER	DER	%CO ₂	DAP	MAP	EPC	Comments
		5	5		í	Reďn	į		l'ssd	
Semi-	Semi-Detached	≯	W 83B	19.00	19.00	-0.01	4.65			
Semi-I	Semi-Detached	≯	83B		19.00		_			
Detached	ned	≶	84B		16.45	0.38	10.0			
Detached	ned	≯	84B		16.45	0.38	10.0			
Detached	hed	≯	84B		16.45	0.38	10.0			
Detached	hed	≶	84B		16.45	0.38	10.0			
Deta	Detached	≯	84B	16.51	16.45		10.0			10.0

Note: L1A 2014 Wales Building Regs.

Specification developed and summarized below.

2. No secondary heating appliance.

100% low energy lights.

4. U-Values used: Ground floor = 0.17W/m²K (65mm screed, 75mm Kingspan K103, DPM, beam & block type floors)

External wall = $0.21W/m^2K$ timber frame wall construction (details to be confirmed).

Pitched roof = $0.10W/m^2K$ (100+150+150mm mineral wool (0.040W/mK)), Windows/Patio Doors= $1.4W/m^2K$, Doors = $1.4W/m^2K$.

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 (semis), 2 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 = $0.0 \text{ W/m}^2\text{K}$)

Building Energy Performance Ltd contact details:

Contact: Kevin O'Donnell

Tel: (029) 20851111

(111000)

Mob: **(07949) 481191**

Email: office@bepltd.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)



Calculation Type: Ne	w built	I (AS D	esigned)		
Property Reference plot1troedyrhiv	N			1	ssued on Date	09/07/2019
Assessment 001				Prop Type Ref	mi Detached Hous	е
Reference	DI.					
Property Plot 1, Troed Y	Rhiw, Ystrad	Mynach				
SAP Rating		83 B	DER	19.00	TER	19.00
nvironmental		85 B	% DER <ter< td=""><td></td><td>-0.01</td><td></td></ter<>		-0.01	
CO₂ Emissions (t/year)		1.34	FEE	49.54	TFEE	N/A
General Requirements Compliance		Pass	% DFEE <tfe< td=""><td>E</td><td>N/A</td><td></td></tfe<>	E	N/A	
Assessor Details Mr. Joseph Goode, joseph@bepltd.co.		de, Tel: 029	20 851111,		Assessor ID	P634-0001
Client	un.					
JMARY FOR INPUT DATA FOR New Bu	ild (As Desig	ned)				
riteria 1 – The DER must be no greater						
a TER and DER						
Fuel for main heating		Mains g	as			
Fuel factor			ains gas)			
Target Carbon Dioxide Emission Rate	(TER)	19.00	8407		kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Ra		19.00			kgCO ₂ /m ²	Pass
S	,	0.00 (0.0	0%)		kgCO ₂ /m ²	
riteria 2 – Limits on design flexibility						
Building Fabric						
2 Fabric U-values						
Element	Averag	e		Highest		
External wall	_	nax. 0.21)		0.21 (max. 0.70)		Pass
Party wall		nax. 0.20)		-		Pass
Floor	,	nax. 0.18)		0.17 (max. 0.70)		Pass
Roof	,	nax. 0.15)		0.10 (max. 0.35)		Pass
Openings	1.40 (m	nax. 1.60)		1.40 (max. 3.30)		Pass
2a Thermal bridging						
Thermal bridging calculated from	linear therm	nal transmit	tances for eac	h junction		
3 Air permeability						
Air permeability at 50 pascals		4.65 (de	sign value)			
Maximum		10.0				Pass
Fixed Building Services						
4 Heating efficiency						
Main heating system			ystem with rad	liators or underfloor	- Mains gas	Pass
			GIC COMBI ES	P1 30		
		Combi b				
		I	cy: 89.6% SEDE m: 88.0%	BUK2009		
Secondary heating system		None	111. 00.070			
5 Cylinder insulation		INOTIC				
5 Cymruer msuration						



Hot water storage

Regs Region: Wales Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.09r14

No cylinder

BASIC COMPLIANCE REPORT Calculation Type: New Build (As Designed)



<u>6 Controls</u>			
Space heating controls	Programmer, room thermostat and	l 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 ² , No overhang		
Windows facing West	3.96 m ² , No overhang		
Air change rate	4.00 ach		
Blinds/curtains	None		
Criterion 4 – Building performance consistent with	DER		
Party Walls			
Туре	U-value		
Filled Cavity with Edge Sealing	0.00	W/m²K	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/m²K	
Air nermeability	Δ 7	m³/m²h	

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





Property Reference	plot1troedy	/rhiw				Iss	ued on Da	te 09/0	07/2019
Assessment	001				Prop Type I	Ref Sem	ni Detached	House	
Reference									
Property	Plot 1, Troe	d Y Rhiw, Ys	strad Mynach						
SAP Rating			83 B	DER	19.	00	TER		19.00
Environmental			85 B	% DER <ter< td=""><td></td><td></td><td>-0.01</td><td></td><td></td></ter<>			-0.01		
CO ₂ Emissions (t/yea	ar)		1.34	FEE	49.5	54	TFEE		N/A
General Requiremen	nts Compliance		Pass	% DFEE <tfee< td=""><td></td><td></td><td>N/A</td><td></td><td></td></tfee<>			N/A		
	Mr. Joseph Goo joseph@bepltd		Goode, Tel: 029	20 851111,			Assessor I	D P63	34-0001
Client									
SUMMARY FOR INPL	JT DATA FOR: N	ew Build (A	s Designed)						
Orientation		West							
Property Tenure		Unknown			j				
Transaction Type		New dwell	ing		İ				
Terrain Type		Suburban							
1.0 Property Type		House, Sen	ni-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		(F Ground Floor: 1st Storey:	Heat Loss Perimet 18.20 m 18.20 m	er Inter	rnal Floor 39.96 m ² 39.96 m ²	2	2.60 2.40	m
7.0 Living Area		11.52			m²				
8.0 Thermal Mass Para	meter	Precise cal	culation]				
Thermal Mass		95.88			kJ/m²K				
9.0 External Walls					•				
Description	Туре	Co	nstruction			U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area (m²)	Nett Area (m²)
External Wall 1	Timber Fr	ame Tir	mber framed wall (o	ne layer of plasterbo	oard)	0.21	9.00	91.00	79.93
9.1 Party Walls									
Description	Туре	Со	nstruction				U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)
Party Wall 1	Filled Cavi Edge Seali	•	ouble plasterboard o th/without sheathin	n both sides, twin ti g board	mber f rame		0.00	20.00	37.00
9.2 Internal Walls Description	Con	struction						Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Plas	terboard on ti	mber frame					9.00	156.48
10.0 External Roofs Description	Туре	Со	nstruction			U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area (m²)	Nett Area (m²)
External Roof 1	External D	lane Roof Dia	asterboard, insulate	d at cailing laval		0.10	9.00	39.96	39.96
LATEITIAI NOOLI	External P	iane noor Tie	isterboard, misdiate	a at ceiling level				00100	



10.2 Internal Ceilings

Regs Region: Wales Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.09r14



Description		Construction								Kappa (kJ/m²K)	Area (m²)
Internal Ceiling	1	Plasterboard ceiling	g, carpeted chipb	oard floor						9.00	39.96
11.0 Heat Loss Flo Description	oors Typ	oe Con	nstruction						alue m²K)	Kappa (kJ/m²K)	Area (m²)
Heat Loss Floor	1 Gro	ound Floor - Solid Sus	pended concrete	floor, carp	eted				17	75.00	39.96
11.2 Internal Floo	ors										
Description		Construction								Kappa (kJ/m²K)	Area (m²)
Internal Floor 1		Plasterboard ceiling	g, carpeted chipb	oard floor						18.00	39.96
12.0 Opening Typ Description	es Data Sourc	се Туре	Glazing		Glazing Gap	Argon Filled	G-val		rame Type	Frame Factor	U Value (W/m²K
Half Glazed Doo		ure Half Glazed Door	Double Low-E	Soft 0.05	Gup	Tilled	0.63		турс	0.70	1.40
Window	r Manufactu r	ure Window	Double Low-E	Soft 0.05			0.63	3		0.70	1.40
L3.0 Openings											
Name	Opening Type	Location	Orientatio n	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	(m²)	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 Window	[1] External Wall 1 [1] External Wall 1	East	Maria	0.00					1.91	
Rear			East	None	0.00					3.29	
4.0 Conservator	•	None				0.4					
15.0 Draught Pro	_	100				%					
L6.0 Draught Lob	by	No									
L7.0 Thermal Brid	lging	Calculate B	ridges								
17.1 List of Bridge											
Source Type		ge Type			Length		Imported				
Table K1 - Appr		teel lintel with perfora	ited steel base pl	ate	7.92	0.500	Yes				
Table K1 - Appr					6.10	0.040	Yes				
Table K1 - Appr		amb Fround floor (normal)			24.90 18.20	0.050 0.160	Yes				
Table K1 - Appr Table K1 - Appr		ntermediate floor with	in a dwolling		18.20	0.100	Yes Yes				
Table K1 - Appr		Eaves (insulation at ce	_		10.80	0.060	No				
Table K1 - Appr		Gable (insulation at ce			7.40	0.240	No				
Table K1 - Appr		Corner (normal)	8,		10.00	0.090	Yes				
Table K1 - Appr		Party wall between dv	vellings		10.00	0.060	Yes				
Table K1 - Defa	ult P1 P	arty wall - Ground floo	or		7.40	0.160	No				
Table K1 - Defa		arty wall - Intermediat			7.40	0.000	No				
Table K1 - Defa		arty wall - Roof (insula	ation at ceiling lev	/el)	7.40	0.240	No				
Y-value		0.097				W/m²K					
18.0 Pressure Tes	ting	Yes									
Designed AP ₅₀)	4.65				m³/(h.m²)) @ 50 Pa	a			
Property Test	ed ?										
As Built AP ₅₀						m³/(h.m²)	\ @ 5∩ P:				

Summer Overheating

Windows open in hot weather

Windows half open





Cross ventilation possible	Yes				
Night Ventilation	No				
Air change rate	4.00				
Mechanical Ventilation					
Mechanical Ventilation System Prese	ent No				
20.0 Farry Over Street Land Street					
20.0 Fans, Open Fireplaces, Flues	MHS	SHS	Other	Total	
Number of Chimneys	0	3113	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	No				
22.0 Lighting					
Internal					
Total number of light fittings	20				
Total number of L.E.L. fittings	20				
Percentage of L.E.L. fittings	100.00			 %	
External	100.00			⁷⁰	
	No				
External lights fitted	INO				
23.0 Electricity Tariff	Standard				
24.0 Main Heating 1	Database				
Percentage of Heat	100			%	
Database Ref. No.	17956				
Fuel Type	Mains gas				
Main Heating	BGW				
SAP Code	104				
In Winter	90.5				
In Summer	87.3				
Controls	CBE Programm	ner, room therm	nostat and TRVs		
PCDF Controls	0				
Delayed Start Stat	No				
Sap Code	2106				
Boiler Compensator	Ideal Boilers, Id	deal, PRT3			
Flue Type	Balanced	,			
Fan Assisted Flue	Yes				
Is MHS Pumped	Pump in heate	ed space			
Heat Emitter	Radiators	эрисс			
Flow Temperature	Normal (> 45°	<u></u>			
Combi boiler type	Standard Com				
Combi keep hot type	None Standard Com	ΝI			
				1	
25.0 Main Heating 2	None				
Community Heating	None				
28.0 Water Heating	HWP From ma	in heating 1			





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	Ratings a	fter improvement
	Typical Cost	per year	SAP rating	Environmental Impact
Solar water heating	£4,000 - £6,000	£29	B 84	
	Typical Cost	Typical savings	Ratings a	after improvement Environmental Impact
	Typical Cost	per year	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 Hou	ise		
Property	Plot 1, Troed Y Rhiw, Ystr	ad Mynach						
SAP Rating		83 B	DER	19.00	TER	19.00		
Environmental		85 B	% DER <ter< th=""><th></th><th>-0.01</th><th></th></ter<>		-0.01			
CO ₂ Emissions (t/yea	r)	1.34	FEE	49.54	49.54 TFEE N/A			
General Requiremen	ts Compliance	Pass	% DFEE <tfe< th=""><th>E</th><th>N/A</th><th></th></tfe<>	E	N/A			
	Mr. Joseph Goode, Joseph Go oseph@bepltd.co.uk	oode, Tel: 029	20 851111,		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: $\fbox{16.52}$ W/mK: Y-Value: $\fbox{0.097}$ W/m²K:





Property Reference	plot1troedyrhiw	plot1troedyrhiw						
Assessment Reference	001 Prop Type Ref				Semi Detached House			
Project	Plot 1, Troed Y Rhiw, Ystr	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< th=""><th></th><th>-0.01</th><th></th></ter<>		-0.01			
CO ₂ Emissions (t/year		1.34	FEE	49.54	TFEE	N/A		
General Requirement	s Compliance	Pass	% DFEE <tfee< th=""><th></th><th colspan="4">N/A</th></tfee<>		N/A			
Assessor Details M	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)	Conductivit y (W/m²K)	Resistance (m ² K/W)	Fraction (%)
Ext surface		, ,	, , ,	0.0346	. ,
Layer 1	Tiling, concrete				
,	Main construction	20	1.5000	0.0115	100.00
Layer 2	airspace/timber battens				
•	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	Sarking felt				
	Main construction	1	0.2300	0.0038	100.00
Layer 4	Loft Space				
	Main construction	0	0.2000	0.2000	100.00
Layer 5	Glassfibre				
	Main construction	150	0.0400	3.7500	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or				
	plastic				
Layer 6	Glassfibre				
	Main construction	150	0.0400	3.7500	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or				
	plastic				
Layer 7	Glassfibre				
	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				
1 0	plastic				
Layer 8	Gyproc Wallboard (12.5mm)	42.5	0.4000	0.0050	400.00
	Main construction	12.5	0.1900	0.0658	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or				
Layer 9	plastic Plaster, standard				
Layer 3	Main construction	3	0.4000	0.0075	100.00
Int surface	IVIAITI COTISCI UCCIOTI	3	0.4000	0.10075	100.00
				0.1000	

Total resistance: Upper limit = 10.308 m² K/W Lower limit = 11.447 m² K/W Average = 10.877 m² K/W

Total correction = $0.0058 \text{ m}^2 \text{ K/W}$ U-value (unrounded) = $0.1 \text{ W/m}^2 \text{ K}$



Regs Region: Wales Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.09r14



Unheated space: None

Total 462 mm U-value: 0.10 W/m² K Kappa: n/a

thickness:





Property Reference	plot1troedyrhiw	Issued on Date	09/07/2019						
Assessment Reference	001 Prop Type Ref				Semi Detached Hous	se			
Project	Plot 1, Troed Y Rhiw, Ystr	Plot 1, Troed Y Rhiw, Ystrad Mynach							
Calculation Type	New Build (As Designed)	New Build (As Designed)							
SAP Rating	83 B	DER	19.00	TER	19.00				
Environmental		85 B	% DER <ter< th=""><th></th><th>-0.01</th><th></th></ter<>		-0.01				
CO₂ Emissions (t/year)		1.34	FEE	49.54	TFEE	N/A			
General Requirements	Compliance	Pass	% DFEE <tfe< th=""><th>E</th><th>N/A</th><th></th></tfe<>	E	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 m², 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:Uw = 0.210 m

Ventilation openings per perimeter length:e = 0.0015 %

Mean wind speed:v = 5.000 m/s

Resistance on solum:Rg = 0.000 m²K/W

lavor	Description	Thickness	Conductivit	Resistance	Fraction
_ayer	Description	(mm)	y (W/m²K)	(m²K/W)	(%)
kt surface				0.1700	
ayer 1	Concrete, dense				
	Main construction	100	2.0000	0.0500	100.00
yer 2	Kingspan K103				
	Main construction	75	0.0180	4.1667	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or				
	plastic				
yer 3	Screed				
	Main construction	65	1.1500	0.0565	100.00
nt surface				0.1700	

Upper limit = $4.613 \text{ m}^2 \text{ K/W}$

Total correction = 0.0082 m² K/W U-value (unrounded) = $0.17 \text{ W/m}^2 \text{ K}$

Unheated space: None

Total U-value: 0.17 W/m² K Kappa: n/a 240 mm

thickness:





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)



Property Reference plot3troedyrhiw			ls	ssued on Date	09/07/201
Assessment 001		P	rop Type Ref De	etached House	
Reference		,			
Property Plot 3, Troed Y Rhiw, Y	strad Mynach				
SAP Rating	84 B	DER	16.45	TER	16.51
Environmental	84 B	% DER <ter< td=""><td></td><td>0.38</td><td></td></ter<>		0.38	
CO₂ Emissions (t/year)	2.32	FEE	60.13	TFEE	N/A
General Requirements Compliance	Pass	% DFEE <tfee< td=""><td></td><td>N/A</td><td></td></tfee<>		N/A	
Assessor Details Mr. Kevin O'Donnell, Build 1111, kevin@bepltd.co.uk	0 0,	nance Limited,	Tel: 029 2085	Assessor ID	P634-000
Client UMARY FOR INPUT DATA FOR New Build (As riteria 1 – The DER must be no greater than t	Designed)				
Client UMARY FOR INPUT DATA FOR New Build (As	Designed)				
UMARY FOR INPUT DATA FOR New Build (As riteria 1 – The DER must be no greater than t	Designed)				
UMARY FOR INPUT DATA FOR New Build (As riteria 1 – The DER must be no greater than to a TER and DER	Designed) he TER				
UMARY FOR INPUT DATA FOR New Build (As riteria 1 – The DER must be no greater than to a TER and DER Fuel for main heating	Designed) he TER Mains gas			kgCO ₂ /m²	
UMARY FOR INPUT DATA FOR New Build (As riteria 1 – The DER must be no greater than to a TER and DER Fuel for main heating Fuel factor	Designed) he TER Mains gas 1.00 (main 16.51			kgCO ₂ /m² kgCO ₂ /m²	Pass
UMARY FOR INPUT DATA FOR New Build (As riteria 1 – The DER must be no greater than to a TER and DER Fuel for main heating Fuel factor Target Carbon Dioxide Emission Rate (TER)	Designed) he TER Mains gas 1.00 (main 16.51	ns gas)			Pass
UMARY FOR INPUT DATA FOR New Build (As riteria 1 – The DER must be no greater than to a TER and DER Fuel for main heating Fuel factor Target Carbon Dioxide Emission Rate (TER) Dwelling Carbon Dioxide Emission Rate (DER	Designed) he TER Mains gas 1.00 (main 16.51 R) 16.45	ns gas)		kgCO₂/m²	Pass
UMARY FOR INPUT DATA FOR New Build (As riteria 1 – The DER must be no greater than to a TER and DER Fuel for main heating Fuel factor Target Carbon Dioxide Emission Rate (TER) Dwelling Carbon Dioxide Emission Rate (DER	Designed) he TER Mains gas 1.00 (main 16.51 R) 16.45	ns gas)		kgCO₂/m²	Pass
UMARY FOR INPUT DATA FOR New Build (As riteria 1 – The DER must be no greater than to a TER and DER Fuel for main heating Fuel factor Target Carbon Dioxide Emission Rate (TER) Dwelling Carbon Dioxide Emission Rate (DER	Designed) he TER Mains gas 1.00 (main 16.51 R) 16.45	ns gas)		kgCO₂/m²	Pass

Roof Openings

2a Thermal bridging

Floor

External wall

Thermal bridging calculated from linear thermal transmittances for each junction

0.21 (max. 0.21)

0.17 (max. 0.18)

0.10 (max. 0.15)

1.40 (max. 1.60)

3 Air permeability

Air permeability at 50 pascals 10.00 (design value)

Maximum 10.0 Pass

0.21 (max. 0.70)

0.17 (max. 0.70)

0.10 (max. 0.35)

1.40 (max. 3.30)

Fixed Building Services

4 Heating efficiency

Main heating system Boiler system with radiators or underfloor - Mains gas Pass

Data from database

Ideal LOGIC COMBI ESP1 35

Combi boiler

Efficiency: 89.6% SEDBUK2009

Minimum: 88.0%

Secondary heating system None

5 Cylinder insulation

Hot water storage No cylinder



Regs Region: Wales Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.09r14

Pass

Pass

Pass

Pass

BASIC COMPLIANCE REPORT Calculation Type: New Build (As Designed)



<u>6 Controls</u>			
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 an	d other gains		
9 Summertime temperature			
Overheating risk (Severn (Wales))	Slight		Pass
Based on:			
Overshading	Average		
Windows facing North	4.35 m², No overhang		
Windows facing East	15.26 m ² , No overhang		
Windows facing South	4.35 m ² , No overhang		
Windows facing West	13.57 m ² , No overhang		
Air change rate	4.00 ach		
Blinds/curtains	None		
Criterion 4 – Building performance consistent wit	h DER		
Air-pressure testing			
3 Air permeability			
Air permeability at 50 pascals	10.00 (design value)		
Maximum	10.0		Pass

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

0.10



10 Key features

Roof U-value

 W/m^2K



Property Reference	plot3troedyrhiw						Issued on D	ate 09/0	07/2019
Assessment	001				Prop Typ	e Ref	Detached Hou		
Reference					- 1- 71-				
Property	Plot 3, Troed Y Rh	iw, Ystr	ad Mynach						
SAP Rating			84 B	DER	1	6.45	TER		16.51
Environmental			84 B	% DER <ter< td=""><td></td><td></td><td>0.38</td><td>3</td><td></td></ter<>			0.38	3	
CO ₂ Emissions (t/year)			2.32	FEE	6	0.13	TFEE		N/A
General Requirements	Compliance		Pass	% DFEE <tfe< td=""><td>Ε</td><td></td><td>N/A</td><td>1</td><td></td></tfe<>	Ε		N/A	1	
	r. Kevin O'Donnell, 11, kevin@bepltd.		g Energy Perf	ormance Limite	d, Tel: 029	2085	Assessor	ID P63	34-0001
Client									
SUMMARY FOR INPUT I	DATA FOR: New Bu	ild (As	Designed)						
Orientation	Wes	 :			7				
Property Tenure	Unkı	iown			j				
Transaction Type	New	dwelling	5						
Terrain Type	Subu	rban							
1.0 Property Type	Hous	e, Detac	hed						
2.0 Number of Storeys	2								
3.0 Date Built	2019								
4.0 Sheltered Sides	2								
5.0 Sunlight/Shade	Aver	age or ui	nknown		7				
6.0 Measurements									
		Gro		Heat Loss Perime 43.97 m 37.21 m	ter In	76.76	m²	Average Stor 2.40 2.60	m
	19.8	Gro	ound Floor:	43.97 m	ter In	76.76	m²	2.40	m
6.0 Measurements		Gro	ound Floor: 1st Storey:	43.97 m		76.76	m²	2.40	m
6.0 Measurements 7.0 Living Area		Gro) se calcul	ound Floor: 1st Storey:	43.97 m		76.76	m²	2.40	m
6.0 Measurements 7.0 Living Area 8.0 Thermal Mass Parame	ter Prec	Gro O se calcul	ound Floor: 1st Storey:	43.97 m] m²	76.76	m² m²	2.40 2.60	m
7.0 Living Area 8.0 Thermal Mass Parame Thermal Mass 9.0 External Walls	ter Prec 81.8	Gro Se calcul 3	ound Floor: 1st Storey: lation	43.97 m	m² kJ/m²K	76.76 78.80 U-Val	ue Kappa	2.40 2.60	m m Nett Area
7.0 Living Area 8.0 Thermal Mass Parame Thermal Mass 9.0 External Walls Description	ter Prec 81.8	Gro Se calcul 3 Const	ound Floor: 1st Storey: lation truction er framed wall (43.97 m 37.21 m	m² kJ/m²K	76.76 78.80 U-Val (W/m	ue Kappa 2K) (kJ/m²K) 1 9.00	2.40 2.60 Gross Area (m²)	m m Nett Area (m²)
7.0 Living Area 8.0 Thermal Mass Parame Thermal Mass 9.0 External Walls Description External Wall 1 Garage 9.2 Internal Walls Description	Type Timber Frame Timber Frame Construction	Gro See calcul 3 Const Timb Timb	lation truction er framed wall (or	43.97 m 37.21 m	m² kJ/m²K	76.76 78.80 U-Val (W/m	ue Kappa 2K) (kJ/m²K) 1 9.00	2.40 2.60 Gross Area (m²) 183.00 20.87	Nett Area (m²) 141.65 20.87
7.0 Living Area 8.0 Thermal Mass Parame Thermal Mass 9.0 External Walls Description External Wall 1 Garage 9.2 Internal Walls	Type Timber Frame Timber Frame	Gro See calcul 3 Const Timb Timb	lation truction er framed wall (or	43.97 m 37.21 m	m² kJ/m²K	76.76 78.80 U-Val (W/m	ue Kappa 2K) (kJ/m²K) 1 9.00	2.40 2.60 Gross Area (m²) 183.00 20.87	Nett Area (m²) 141.65 20.87
7.0 Living Area 8.0 Thermal Mass Parame Thermal Mass 9.0 External Walls Description External Wall 1 Garage 9.2 Internal Walls Description	Type Timber Frame Timber Frame Construction	Gro See calcul 3 Const Timb Timb	lation truction er framed wall (or	43.97 m 37.21 m	m² kJ/m²K	76.76 78.80 U-Val (W/m	ue Kappa ² K) (kJ/m²K) 1 9.00 1 9.00 ue Kappa	2.40 2.60 Gross Area (m²) 183.00 20.87 Kappa (kJ/m²K) 9.00	Nett Area (m²) 141.65 20.87 Area (m²) 246.48
7.0 Living Area 8.0 Thermal Mass Parame Thermal Mass 9.0 External Walls Description External Wall 1 Garage 9.2 Internal Walls Description Internal Wall 1	Type Timber Frame Timber Frame Construction	Gro See calcul 3 Const Timbo Timbo n	lation truction er framed wall (or per frame)	43.97 m 37.21 m	m² kJ/m²K	U-Val (W-Val U-Val	ue Kappa (kJ/m²K) ue Kappa (s./m²k) ue Kappa (kJ/m²k)	2.40 2.60 Gross Area (m²) 183.00 20.87 Kappa (kJ/m²K) 9.00	Nett Area (m²) 141.65 20.87 Area (m²) 246.48
7.0 Living Area 8.0 Thermal Mass Parame Thermal Mass 9.0 External Walls Description External Wall 1 Garage 9.2 Internal Walls Description Internal Wall 1	Type Timber Frame Timber Frame Construction Plasterboar Type	Gro se calcul Consi Timbi Timbi Consi	lation truction er framed wall (or per frame)	43.97 m 37.21 m	m² kJ/m²K	U-Val (W/m 0.2: 0.2:	ue Kappa (kJ/m²K) ue Kappa (s./m²k) ue Kappa (kJ/m²k)	2.40 2.60 Gross Area (m²) 183.00 20.87 Kappa (kJ/m²K) 9.00 Gross Area (m²)	Nett Area (m²) 141.65 20.87 Area (m²) 246.48 Nett Area (m²)
7.0 Living Area 8.0 Thermal Mass Parame Thermal Mass 9.0 External Walls Description External Wall 1 Garage 9.2 Internal Walls Description Internal Wall 1 10.0 External Roofs Description External Roof 1 10.2 Internal Ceilings	Type Timber Frame Timber Frame Construction Plasterboar Type External Plane Ro	Gro se calcul Consi Timbo Timbo Consi Of Plasto	lation truction er framed wall (or per frame)	43.97 m 37.21 m	m² kJ/m²K	U-Val (W/m 0.2: 0.2:	ue Kappa (kJ/m²K) ue Kappa (s./m²k) ue Kappa (kJ/m²k)	2.40 2.60 Gross Area (m²) 183.00 20.87 Kappa (kJ/m²K) 9.00 Gross Area (m²) 78.80	Nett Area (m²) 141.65 20.87 Area (m²) 246.48 Nett Area (m²) 78.80



Regs Region: Wales Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.09r14



Description	٦	Гуре		Construction					U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)
Heat Loss Floo	r1 (Ground	Floor - Solid	Suspended concrete	floor, carp	eted			0.17	75.00	76.76
Garage	E	Expose	d Floor -	Γimber exposed floor	r, insulatio	n between jo	oists		0.19	20.00	15.86
		Γimber									
1.2 Internal Flo	ors										
Description		C	onstruction							Kappa (kJ/m²K)	Area (m²)
Internal Floor	1	Р	lasterboard cei	ling, carpeted chipbo	oard floor					18.00	62.91
2.0 Opening Ty	pes										
Description	Data So	urce	Туре	Glazing		Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²k
Half Glazed Do	or Manufa r	icture	Half Glazed Do	or Double Low-E	Soft 0.05			0.63		0.70	1.40
Window	Manufa r	icture	Window	Double Low-E	Soft 0.05			0.63		0.70	1.40
3.0 Openings											
Name	Opening Type	L	ocation	Orientatio	Curtain	Overhang	Wide		leight Cour		Curtain
Front	Half Glazed Do	or [1] External Wal	n 1 West	Type	Ratio	Overhang	(m)	(m)	(m²)	Closed
Front	Window		1] External Wal		None	0.00				1.91 13.57	
Rear	Half Glazed Do	-	1] External Wal		None	0.00				1.91	
Rear	Window		1] External Wal		None	0.00				15.26	
Side	Window		1] External Wal		None	0.00				4.35	
SIde	Window	-	1] External Wal		None	0.00				4.35	
4.0 Conservato	ry		None								
L5.0 Draught Pro	oofing		100				%				
16.0 Draught Lob	oby		No								
L7.0 Thermal Bri	dging		Calculat	e Bridges							
7.1 List of Bridg	es										
Source Type	В	ridge T	уре			Length	Psi	Imported			
Table K1 - App		1 Steel	lintel with perf	orated steel base pla	ate	29.73	0.500	No			
Table K1 - App		3 Sill				27.91	0.040	No			
Table K1 - App		4 Jamb				55.50	0.050	No			
Table K1 - App			nd floor (norm	,		55.50	0.160	No			
Table K1 - Defa			osed floor (inve			8.03	0.320	No			
Table K1 - App				vithin a dwelling		43.97	0.070	No			
Table K1 - App Table K1 - App			es (insulation a ner (normal)	. ceiling level)		43.97 22.60	0.060	No No			
Table K1 - App				internal area greater	than	15.00	-0.090	No			
Table KI - App		xternal		internar area greater	tiiaii	15.00	-0.030	140			
Y-value			0.098				W/m²K				
.8.0 Pressure Te	sting		Yes								
Designed AP	50		10.00				$m^3/(h.m^2)$) @ 50 Pa			
Property Tes	ted ?										
As Built AP ₅₀							m³/(h.m²) @ 50 Pa			
.9.0 Mechanical	Ventilation										
Summer Ove	_		-								
Windows	open in hot we	ather	Win	dows half open							
Cross ver	ntilation possible	е	Yes								
Night Vei	ntilation		No				_				



Air change rate

4.00



Mechanical Ventilation					
Mechanical Ventilation System Pres	sent No				
20.0 Fans, Open Fireplaces, Flues					
	MHS	SHS	Other	Total	
Number of Chimneys	0		0	0	
Number of open flues Number of intermittent fans	0		0	0 5	
Number of passive vents				0	
Number of flueless gas fires				0	
21.0 Fixed Cooling System	No]	
22.0 Lighting					
Internal					
Total number of light fittings	14				
Total number of L.E.L. fittings	14				
Percentage of L.E.L. fittings	100.00			%	
External	1			-	
External lights fitted	No]	
23.0 Electricity Tariff	Standard]	
24.0 Main Heating 1	Database]	
Percentage of Heat	100				
Database Ref. No.	17929]	
Fuel Type	Mains gas			1	
Main Heating	BGW]	
SAP Code	104			1	
In Winter	90.5			1	
In Summer	87.3			1	
Controls	CBI Time and to	emperature zo	ne control	1	
PCDF Controls	0	'		1	
Delayed Start Stat	No			1	
Sap Code	2110]	
Boiler Compensator	Ideal Boilers, Id	leal. PRT3		1	
Flue Type	Balanced	,		1	
Fan Assisted Flue	Yes			1	
Is MHS Pumped	Pump in heated	d space		1	
Heat Emitter	Radiators	а эрисс		<u></u>	
Flow Temperature	Normal (> 45°C	`\		1	
Combi boiler type	Standard Comb]]	
Combi keep hot type	None	<i>7</i> 1]]	
				1	
25.0 Main Heating 2	None				
Community Heating	None]	
28.0 Water Heating	HWP From mai	in heating 1		Ī	
Water Heating	Main Heating 1			Ī	
Flue Gas Heat Recovery System	No]	
Waste Water Heat Recovery	No]	
				=	





9.0 Hot Water Cylinder		None]
SAP Code		901	
Water use <= 125 litres	/person/day	Yes	
Solar Panel		No	
Waste Water Heat Reco	overy	No	
Waste Water Heat Reco	2	No	
Instantaneous System 3	1		

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

Typical Cost Typical Savings Ratings after improvement per year SAP rating Environmental Impact \$
50lar photovoltaic panels, 2.5 kWp £3,500 - £5,500 £320 B 91



THERMAL BRIDGING

Calculation Type: New Build (As Designed)



Property Reference	plot3troedyrhiw	plot3troedyrhiw				09/07/2019		
Assessment Reference	001		Prop Type Ref	Detached House				
Property	Plot 3, Troed Y Rhiw, Ystr	ad Mynach						
SAP Rating		84 B	DER	16.45	TER	16.51		
Environmental		84 B	% DER <ter< th=""><th></th><th>0.38</th><th></th></ter<>		0.38			
CO ₂ Emissions (t/ye	ar)	2.32	FEE	60.13	TFEE	N/A		
General Requireme	nts Compliance	Pass	% DFEE <tfe< th=""><th>E</th><th>N/A</th><th></th></tfe<>	E	N/A			
Assessor Details	Mr. Kevin O'Donnell, Building 1111, kevin@bepltd.co.uk	g Energy Perfo	rmance Limite	d, Tel: 029 2085	l: 029 2085			
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/m²K:





Property Reference	plot3troedyrhiw				Issued on Date	09/07/2019		
Assessment Reference	001 Prop			Prop Type Ref	Detached House			
Project	Plot 3, Troed Y Rhiw, Ystr	ad Mynach						
Calculation Type	New Build (As Designed)							
SAP Rating	84 B	DER	16.45	TER	16.51			
Environmental	84 B	% DER <ter< th=""><th></th><th colspan="3">0.38</th></ter<>		0.38				
CO₂ Emissions (t/year)		2.32	FEE	60.13	TFEE	N/A		
General Requirements Compliance Pass % DFEE<1			% DFEE <tfe< th=""><th>E</th><th colspan="4">N/A</th></tfe<>	E	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)	Conductivit y (W/m²K)	Resistance (m²K/W)	Fraction (%)
Ext surface				0.0346	
Layer 1	Tiling, concrete				
	Main construction	20	1.5000	0.0115	100.00
Layer 2	airspace/timber battens				
	Main construction	25	0.0000	0.0000	89.63
	Main construction	25	0.1563	0.1386	10.37
	Corrections - Cavity Ventilated, Emissivity: Normal				
ayer 3	Sarking felt				
	Main construction	1	0.2300	0.0038	100.00
ayer 4	Loft Space				
	Main construction	0	0.2000	0.2000	100.00
ayer 5	Glassfibre				
	Main construction	150	0.0400	3.7500	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or				
	plastic				
ayer 6	Glassfibre				
	Main construction	150	0.0400	3.7500	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or				
	plastic				
ayer 7	Glassfibre				
	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				
ayer 8	Gyproc Wallboard (12.5mm)				
	Main construction	12.5	0.1900	0.0658	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or				
	plastic				
ayer 9	Plaster, standard				
	Main construction	3	0.4000	0.0075	100.00
Int surface				0.1000	

Total resistance: Upper limit = $10.308 \text{ m}^2 \text{ K/W}$ Lower limit = $11.447 \text{ m}^2 \text{ K/W}$ Average = $10.877 \text{ m}^2 \text{ K/W}$

Total correction = $0.0058 \text{ m}^2 \text{ K/W}$ U-value (unrounded) = $0.1 \text{ W/m}^2 \text{ K}$



Regs Region: Wales Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.09r14



Unheated space: None

Total 462 mm U-value: 0.10 W/m² K Kappa: n/a

thickness:





Property Reference	plot3troedyrhiw				Issued on Date	09/07/2019		
Assessment Reference	001			Prop Type Ref	op 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< th=""><th></th><th colspan="3">0.38</th></ter<>		0.38			
CO₂ Emissions (t/year)		2.32	FEE	60.13	TFEE	N/A		
General Requirements Compliance		Pass	% DFEE <tf< th=""><th>E</th><th colspan="4">N/A</th></tf<>	E	N/A			
	Details Mr. Kevin O'Donnell, Building Energy Performance Limited, Tel: 029 2085 1111, kevin@bepltd.co.uk Assessor ID P634-00					P634-0001		
Client								

Building Elements

Floor 000002

Floor Type: Suspended Floor

Area = 39.96 m², 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:Uw = 0.210 m

Ventilation openings per perimeter length:e = 0.0015 %

Mean wind speed:v = 5.000 m/s

Resistance on solum:Rg = 0.000 m²K/W

Laver	Description	Thickness	Conductivit	Resistance	Fraction
Layer		(mm)	y (W/m²K)	(m^2K/W)	(%)
Ext surface				0.1700	
Layer 1	Concrete, dense				
	Main construction	100	2.0000	0.0500	100.00
Layer 2	Kingspan K103				
	Main construction	75	0.0180	4.1667	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or				
	plastic				
ayer 3	Screed				
	Main construction	65	1.1500	0.0565	100.00
Int surface				0.1700	

Total correction = 0.0082 m² K/W U-value (unrounded) = $0.17 \text{ W/m}^2 \text{ K}$

Unheated space: None

> Total 240 mm U-value: 0.17 W/m² K Kappa: n/a

thickness:



Regs Region: Wales Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.09r14



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			DER	16.45	16.45 TER			
Environmental			% DER <ter< th=""><th></th><th colspan="3">0.38</th></ter<>		0.38			
CO₂ Emissions (t/year)		2.32	FEE	60.13	TFEE	N/A		
General Requirements Compliance Pass % DFEE<1			% DFEE <tfe< th=""><th>Ε</th><th colspan="4">N/A</th></tfe<>	Ε	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)	Conductivit y (W/m²K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	Plaster, standard				
	Main construction	3	0.4000	0.0075	100.00
Layer 2	Plasterboard, standard				
	Main construction	12.5	0.2100	0.0595	100.00
Layer 3	Plasterboard, standard				
	Main construction	12.5	0.2100	0.0595	100.00
Layer 4	Glassfibre				
	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	Orientated Strand Board				
	Main construction	18	0.1300	0.1385	100.00
Int surface				0.1700	

Total resistance: Upper limit = 5.611 m² K/W Lower limit = 5.485 m² K/W Average = 5.548 m² K/W

Total correction = $0.0082 \text{ m}^2 \text{ K/W}$ U-value (unrounded) = $0.19 \text{ W/m}^2 \text{ K}$

Unheated space: None

Total 296 mm U-value: 0.19 W/m² K Kappa: n/a

thickness:



Regs Region: Wales Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.09r14