



BUILDING REGULATIONS Part L1A SAP ASSESSMENT

DEVELOPMENT

**New Dwelling
Bro Sion Wyn
Chwilog
Pwllheli**

COMMISSIONED BY

**Alwyn Williams
GT Williams Engineering Ltd
Pwll Parc Depot
Edern
Pwllheli, LL53 8YT**

Our Ref: 21-303

Barlings kwa have been appointed by Alwyn Williams at GT Williams Engineering to carry out a Standard Assessment Procedure (SAP) and Energy Performance Certificate (EPC) for the proposed New Dwelling Bro Sion Wyn, Chwilog.

The purpose of this report is to demonstrate compliance with Approved Document L1A of the 2013 Building Regulations.

The report demonstrates compliance within these regulations. Therefore, it is important that you read through all the information supplied and contact us to amend any information that is incorrect. If you do you decide to make changes to the details included in this assessment then please let us know so we can check your dwelling is still compliant.

24 Fiskerton Road, Reepham, Lincoln, LN3 4EB 01522 797344

Registered in England Company No: 9094283
Vat Registration Number: 247 4862 76

Summary of Design SAP

The SAP assessment has been completed using the following elements within the dwelling.

ELEMENT	TARGET	DESCRIPTION
External Wall	0.18 U-VALUE W/M ² K	See below Kingspan U-Value
Plane Roof	0.11 U-VALUE W/M ² K	400mm Mineral Wool in between and over joists, 12.5mm Plasterboard, 3mm Skim
Bay Roof	0.24 U-VALUE W/M ² K	100mm Thermarroof TR21 zero ODP in between Joists, 50mm Joist Zone, 32.5mm Kooltherm K18 Insulated Plasterboard, 3mm Skim
Ground Floor	0.16 U-VALUE W/M ² K	150mm Hardcore, 100mm Thermafloor TF70 zero ODP, 22mm Floorboarding
Fixed Glazing	1.5 U-VALUE W/M ² K	
Doors	1.5 U-VALUE W/M ² K	
Design Air Permeability Rate	5.0 m ³ /(h.m ²)	An air permeability test will be required at completion of the building work.

Heating, Lighting, Ventilation & Hot Water		
Main Heating	Electric Convactor Storage Heaters	The controls for the heating system should include Automatic Charge Control .
Hot Water	Immersion & 210 Ltr Cylinder	Fully insulated cylinder
Secondary Heating	N/A	

Lighting	100% low energy lighting within the dwelling.	All external lighting to be low energy lamps or have motion sensor control
Extractors	Intermittent Fans	
PV Array	5.00 PV Cells kW Peak	West orientation with little or no overshadowing

Assumptions Made

The following assumptions have been made within the SAP assessment:

- Main Heating/Domestic Hot Water.
- Heating Controls.
- Number and type of showers.
- Insulation to primary pipe work.
- Thermal bridging details.
- PV Array location and amount.

Risk of Summer time Overheating

Thermal Mass	Medium
Windows open in hot weather	Windows fully open
Cross Ventilation possible	YES
Night Ventilation	N/A
Air Change Rate	8.00
Over Heating Risk	Not Significant

Accredited Construction Details

Accredited Construction Details & CBA Details have been included within this assessment, it is very important that these details are followed.

Please Note: Evidence will be required at completion of the development, therefore it is very important that these details are followed and any changes to our assumed details are noted in the process of the development on site to prevent problems at completion.

THERMAL BRIDGING

Calculation Type: New Build (As Designed)



Property Reference	21-303		Issued on Date	18/11/2021	
Assessment Reference	21-303	Prop Type Ref	Detached Dwelling		
Property	Bro Sion Wyn, Chwilog, Pwllheli				
SAP Rating	92 A	DER	26.17	TER	26.53
Environmental	78 C	% DER<TER	1.34		
CO ₂ Emissions (t/year)	2.48	FEE	58.97	TFEE	N/A
General Requirements Compliance	Pass	% DFEE<TFEE	N/A		
Assessor Details	Mrs. Kerry Simpson, Barlings kwa Limited, Tel: 01522 797344, kerry@barlingskwa.co.uk			Assessor ID	Y750-0001
Client					

	Junction detail	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E2 Other lintels (including other steel lintels)	Table K1 - Approved	0.300	33.17	9.95	
External wall	E3 Sill	Independently assessed	0.018	25.87	0.47	cba
External wall	E4 Jamb	Independently assessed	0.013	70.20	0.91	cba
External wall	E5 Ground floor (normal)	Table K1 - Approved	0.160	33.88	5.42	
External wall	E6 Intermediate floor within a dwelling	Independently assessed	0.001	33.88	0.03	cba
External wall	E10 Eaves (insulation at ceiling level)	Table K1 - Approved	0.060	30.78	1.85	
External wall	E24 Eaves (insulation at ceiling level - inverted)	Table K1 - Default	0.240	4.05	0.97	
External wall	E14 Flat roof	Table K1 - Default	0.080	7.15	0.57	
External wall	E16 Corner (normal)	Independently assessed	0.064	43.00	2.75	cba
External wall	E17 Corner (inverted – internal area greater than external area)	Independently assessed	-0.110	23.00	-2.53	cba

Total: **20.40** W/mK:
 Y-Value: **0.071** W/m²K:

Conclusion

We have been able to demonstrate that the proposed dwelling complies with the requirements of Approved Document L1A of the 2013 Building Regulations, based on the information supplied and the assumptions detailed in this report.

As-Built Stage

It is important that you agree with the design parameters and assumptions made, as changes to the design parameters during the construction of the dwelling may affect the overall As-Built SAP Assessment.

Any proposed changes could result in enhancements having to be made to bring the As-Built SAP back into compliance and may delay the issuing of a completion certificate from the building control body. Therefore, it is important that any changes are reported to us so we can model the overall effect on the assessment and relay any changes that may be required.

Upon completion of the works an As-Built SAP will be required, taking into account the As-Built construction and any changes or modifications on site. We will ask you to confirm in writing that the As-Built dwelling has been constructed as detailed.

We will require the following documentary evidence before we can formally issue the final Energy Performance Certificate.

- Completed air pressure test certificate.
- Accredited Construction Details (See section 3.0 of this report)
- The full postal address of the dwelling.
- A declaration that the construction conforms to the design stage SAP Assessment.

Without the above information we will not be able to issue the As-Built SAP Assessment and Energy Performance Certificate.

As-Designed Compliance SAP Assessment

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



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SAP Rating	92 A	DER	26.17	
Environmental	78 C	TER	26.53	
CO₂ Emissions (t/year)	2.48	% DER<TER	1.34	
General Requirements Compliance	Pass	FEE	58.97	
		TFEE	N/A	
		% DFEE<TFEE	N/A	
Assessor Details	Mrs. Kerry Simpson, Barlings kwa Limited, Tel: 01522 797344, kerry@barlingskwa.co.uk		Assessor ID	Y750-0001
Client				

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	Electricity		
Fuel factor	1.55 (electricity)		
Target Carbon Dioxide Emission Rate (TER)	26.53	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	26.17	kgCO ₂ /m ²	Pass
	-0.36 (-1.4%)	kgCO ₂ /m ²	

Criteria 2 – Limits on design flexibility

Building Fabric

2 Fabric U-values

Element	Average	Highest	
External wall	0.18 (max. 0.21)	0.18 (max. 0.70)	Pass
Floor	0.16 (max. 0.18)	0.16 (max. 0.70)	Pass
Roof	0.12 (max. 0.15)	0.24 (max. 0.35)	Pass
Openings	1.50 (max. 1.60)	1.50 (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	5.00 (design value)	
Maximum	10.0	Pass

Fixed Building Services

4 Heating efficiency

Main heating system	Electric storage heaters - Electric Convactor storage heaters	
Secondary heating system	None	

5 Cylinder insulation

Hot water storage	Nominal cylinder loss: 2.01 kWh/day Permitted by DBSCG 2.30	Pass
Primary pipework insulated	No primary pipework	

6 Controls

BASIC COMPLIANCE REPORT



Calculation Type: New Build (As Designed)

Space heating controls

Hot water controls

7 Low energy lights

Percentage of fixed lights with low-energy fittings %

Minimum %

8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting overheating due to solar and other gains

9 Summertime temperature

Overheating risk (Wales)

Based on:

Overshading

Windows facing North

Windows facing East

Windows facing South

Windows facing West

Air change rate

Blinds/curtains

Criterion 4 – Building performance consistent with DER

Air-pressure testing

3 Air permeability

Air permeability at 50 pascals

Maximum

10 Key features

Roof U-value W/m²K

Photovoltaic array kW

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



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

Orientation	South
Property Tenure	Unknown
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	House, Detached
2.0 Number of Storeys	2
3.0 Date Built	2021
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:	33.88 m	60.48 m ²	2.40 m
1st Storey:	33.88 m	60.48 m ²	2.60 m

7.0 Living Area m²

8.0 Thermal Mass Parameter
 Thermal Mass
 kJ/m²K

9.0 External Walls

Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall	Cavity Wall	0.18	167.85	119.61

10.0 External Roofs

Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Plane Roof	External Plane Roof	0.11	57.34	57.34
Bay Roof	External Flat Roof	0.24	3.14	3.14

11.0 Heat Loss Floors

Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Ground Floor	Ground Floor - Solid		0.16	60.48

12.0 Opening Types

SUMMARY FOR INPUT DATA



Calculation Type: New Build (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
Glazing	Manufacturer	Window	Double Low-E Hard 0.2			0.72		0.70	1.50
Door	Manufacturer	Solid Door							1.50
Glazed Door	Manufacturer	Half Glazed Door	Double Low-E Hard 0.2			0.72		0.70	1.50

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m ²)	Curtain Closed
South	Solid Door	[1] External Wall	South							2.10	
South	Window	[1] External Wall	South	None	0.00					10.88	
North	Window	[1] External Wall	North	None	0.00					15.81	
East	Window	[1] External Wall	East	None	0.00					11.97	
West	Half Glazed Door	[1] External Wall	West							1.89	
West	Window	[1] External Wall	West	None	0.00					5.59	

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	E2 Other lintels (including other steel lintels)	33.17	0.300	Yes
Independently assessed	E3 Sill	25.87	0.018	No cba
Independently assessed	E4 Jamb	70.20	0.013	Yes cba
Table K1 - Approved	E5 Ground floor (normal)	33.88	0.160	Yes
Independently assessed	E6 Intermediate floor within a dwelling	33.88	0.001	Yes cba
Table K1 - Approved	E10 Eaves (insulation at ceiling level)	30.78	0.060	No
Table K1 - Default	E24 Eaves (insulation at ceiling level - inverted)	4.05	0.240	No
Table K1 - Default	E14 Flat roof	7.15	0.080	No
Independently assessed	E16 Corner (normal)	43.00	0.064	No cba
Independently assessed	E17 Corner (inverted – internal area greater than external area)	23.00	-0.110	No cba

Y-value W/m²K

18.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Property Tested ?

As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

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				4

SUMMARY FOR INPUT DATA



Calculation Type: New Build (As Designed)

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
 Light and motion sensor

23.0 Electricity Tariff

24.0 Main Heating 1

Percentage of Heat %
 Main Heating
 SAP Code
 Efficiency (SAP Table) %
 Controls
 Sap Code

25.0 Main Heating 2

Community Heating

28.0 Water Heating

Water Heating
 Flue Gas Heat Recovery System
 Waste Water Heat Recovery Instantaneous System 1
 Waste Water Heat Recovery Instantaneous System 2
 Waste Water Heat Recovery Storage System
 Solar Panel
 Water use <= 125 litres/person/day
 SAP Code
 Immersion Heater

29.0 Hot Water Cylinder

Cylinder In Heated Space
 Insulation Type
 Insulation Thickness
 Cylinder Volume L

32.0 Photovoltaic Unit

PV Cells kWp	Orientation	Elevation	Overshading	Connected to Dwelling
5.00	West	30°	None Or Little	Yes

Recommendations

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)



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	£104	A 94	

U-Value Calculations



U-Value Calculator Results

18 November 2021

Kerry Simpson

21-303 Bro Sion Wyn

Dear Kerry Simpson,

Thank you for using the Kingspan Insulation U-Value Calculator.

The full specification for the construction you have selected and the result of your calculation are on the next page.

To purchase the insulation suggested by the calculation please visit kingspaninsulation.co.uk/stockists to find your nearest supplier.

Product information can be found on our website kingspaninsulation.co.uk, and provides more detailed information on construction build ups, sitework and installation guidance.

Kingspan Insulation Ltd, Pembridge, Leominster, Herefordshire HR6 9LA

Tel: +44 (0) 1544 387382

kingspaninsulation.co.uk

Project ID : Online
 Structure element : Wall
 Description : Brick and block cavity wall, partial fill, 2.5 ties per m², cavity less than or equal to 125mm
 File reference : 1E1321533A.FCF

Calculated 'U' value = 0.18W/m²K (Calculated in accordance with BS EN ISO 6946:2017)

Condensation risk has been assessed up to and including Level 4 Humidity Class (dwellings with high occupancy) within UK worst case environmental conditions.

Element Description	Element Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m ² K/W)	Vapour Resistivity (MNs/gm)	Vapour Resistance (MNs/g)	Mean T (K)	Delta T (K)
Outside surface resistance	-	-	0.040	-	-	78.26	0.10
POLYMER RENDER	10.0	0.115	0.087	100.00	1.00	78.42	0.22
BLOCKWORK 2000 kg/m ³ (k-value = 1.13 W/mK)	100.0	1.130	0.088	45.00	4.50	78.65	0.23
UNV. A/SPACE;	50.0	-	0.665	-	0.05	79.61	1.70
KOOLTHERM K108	70.0	0.018	3.889	-	100.00	85.45	9.97
AERATED BLOCK (k-value = 0.15 W/mK) 6.6% Mortar (100.0mm)	100.0	0.150	0.667	45.00	4.50	91.29	1.71
PLASTER DABS CAVITY. 20.0% Plaster dabs (15.0mm)	15.0	-	0.180	-	0.05	92.37	0.46
PLASTERBOARD	12.5	0.190	0.066	50.00	0.63	92.69	0.17
PLASTER SKIM	3.0	0.180	0.017	60.00	0.18	92.80	0.04
Inside surface resistance	-	-	0.130	-	-	92.98	0.33

Detailed U-value Calculation Results

Construction includes 3 bridged layers.

Non-bridged layers

Outside surface resistance	0.040 m ² K/W
POLYMER RENDER	0.087 m ² K/W
BLOCKWORK 2000 kg/m ³ (k-value = 1.13 W/mK)	0.088 m ² K/W
UNV. A/SPACE;	0.665 m ² K/W
KOOLTHERM K108	3.889 m ² K/W
PLASTERBOARD	0.066 m ² K/W
PLASTER SKIM	0.017 m ² K/W
<u>Inside surface resistance</u>	<u>0.130 m²K/W</u>
Resistance of non-bridged layers, R _{NB} =	<u>4.982 m²K/W</u>

Not all insulation thicknesses shown may currently be stocked, so please check with Kingspan Insulation Customer Service Department on 01544 388601.

Whilst the information and/or specification contained herein is to the best of our knowledge true and accurate we specifically exclude any liability for errors, omissions or otherwise arising therefrom. Details, practices, principles, values and calculations should be verified as to accuracy and suitability for the required purpose for use.

Detailed U-value Calculation Results (continued)

Resistance of heat flow paths

$$R_{P1} = R_{NB} + R_{L1} = 4.982 + 0.847 = 5.829 \text{ m}^2\text{K/W} \quad F_{P1} = 74.746\%$$

$$R_{P2} = R_{NB} + R_{L2} = 4.982 + 0.294 = 5.276 \text{ m}^2\text{K/W} \quad F_{P2} = 5.254\%$$

$$R_{P3} = R_{NB} + R_{L3} = 4.982 + 0.702 = 5.683 \text{ m}^2\text{K/W} \quad F_{P3} = 18.686\%$$

$$R_{P4} = R_{NB} + R_{L4} = 4.982 + 0.149 = 5.130 \text{ m}^2\text{K/W} \quad F_{P4} = 1.314\%$$

Fraction of face area of materials

BLOCKWORK 2000 kg/m³ (k-value = 1.13 W/mK), $F_{L1} = 93.3\%$
 Mortar, $F_{B1} = 6.7\%$
 AERATED BLOCK (k-value = 0.15 W/mK), $F_{L2} = 80.0\%$
 Mortar, $F_{B2} = 20.0\%$

Fraction of face area of heat flow paths

$$F_{P1} = F_{L1} \times F_{L2} = 0.747$$

$$F_{P2} = F_{L1} \times F_{B2} = 0.187$$

$$F_{P3} = F_{B1} \times F_{L2} = 0.053$$

$$F_{P4} = F_{B1} \times F_{B2} = 0.013$$

Upper resistance limit

$$R_{upper} = 1 / ((F_{P1}/R_{P1}) + (F_{P2}/R_{P2}) + (F_{P3}/R_{P3}) + (F_{P4}/R_{P4}))$$

$$R_{upper} = 1 / ((0.747/5.829) + (0.053/5.276) + (0.187/5.683) + (0.013/5.130)) = 5.759 \text{ m}^2\text{K/W}$$

Lower resistance limit

$$R_{lower} = R_{NB} + 1 / ((F_{L1}/R_{L1}) + (F_{B1}/R_{B1})) + 1 / ((F_{L2}/R_{L2}) + (F_{B2}/R_{B2})) + 1 / ((F_{L3}/R_{L3}) + (F_{B3}/R_{B3}))$$

$$R_{lower} = 4.982 + 1 / ((0.9333/0.6667) + (0.0667/0.1136)) + 1 / ((0.8000/0.1804) + (0.2000/0.0349)) + 1 / ((0.0000/0.0000) + (1.0000/0.0000)) = 5.584 \text{ m}^2\text{K/W}$$

Total resistance of wall

$$R_T = (R_{upper} + R_{lower}) / 2 = (5.759 + 5.584) / 2 = 5.671 \text{ m}^2\text{K/W}$$

(Correction for mechanical fasteners, Delta Uf = 0.0027W/m²K | Correction for air gaps, Delta Ug = 0.0000W/m²K)

(Alpha 0.8 m⁻¹ | Fasteners per square metre 2.5000)

(Fasteners cross-sectional area 12.500 mm² | Thermal conductivity of fastener 17.00 W/mK)

(Delta Uf + Delta Ug) is less than 3% of (1 / Rt) so U = (1 / Rt) = 0.18W/m²K

U-VALUE CALCULATOR REPORT



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Assessor Details	Mrs. Kerry Simpson, Barlings kwa Limited, Tel: 01522 797344, kerry@barlingskwa.co.uk	Assessor ID	Y750-0001
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Client	
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Building Elements

Roof Plane Roof

Roof Type: Pitched Roof, insulated flat ceiling

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	Mineral wool				
	Main construction	300	0.0400	7.5000	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 2	Mineral wool				
	Main construction	100	0.0400	2.5000	91.67
	Main construction	100	0.1300	0.7692	8.33
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 3	Plasterboard, standard				
	Main construction	12.5	0.2100	0.0595	100.00
Layer 4	Plaster, standard				
	Main construction	3	0.4000	0.0075	100.00
Int surface				0.1000	

Total resistance: Upper limit = 10.036 m² K/W Lower limit = 9.812 m² K/W Average = 9.924 m² K/W
 Total correction = 0.0062 m² K/W U-value (unrounded) = 0.11 W/m² K

Unheated space:	None
Total thickness: 416 mm	U-value: 0.11 W/m² K
Kappa: n/a	

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Client	
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Building Elements

Roof Bay Roof

Roof Type: Flat Roof standard (no precipitation)

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	Thermarroof TR21 zero ODP (*80mm to 115mm)				
	Main construction	100	0.0260	3.8462	88.89
	Main construction	100	0.1300	0.7692	11.11
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 2	Joist Zone				
	Main construction	50	0.3125	0.1600	88.89
	Main construction	50	0.1300	0.3846	11.11
	Corrections - Cavity Unventilated, Emissivity: Normal				
Layer 3	Kooltherm K18 Insulated Plasterboard (32.5mm)				
	Main construction	32.5	0.0361	0.9000	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 4	Plaster, standard				
	Main construction	3	0.4000	0.0075	100.00
Int surface				0.1000	

Total resistance: Upper limit = 4.336 m² K/W Lower limit = 3.881 m² K/W Average = 4.109 m² K/W
 Total correction = 0.0047 m² K/W U-value (unrounded) = 0.24 W/m² K

Unheated space:	None
Total thickness:	186 mm
U-value:	0.24 W/m ² K
Kappa:	n/a

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Environmental	78 C	% DER<TER	1.34		
CO ₂ Emissions (t/year)	2.48	FEE	58.97	TFEE	N/A
General Requirements Compliance	Pass	% DFEE<TFEE	N/A		

Assessor Details	Mrs. Kerry Simpson, Barlings kwa Limited, Tel: 01522 797344, kerry@barlingskwa.co.uk	Assessor ID	Y750-0001
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Client	
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Building Elements

Floor Ground Floor

Floor Type: Slab On Ground Floor

Area = 60.48 m², Perimeter = 33.88 m, Wall thickness = 352.00 mm, Soil: Unknown

Horizontal edge insulation: none

Vertical edge insulation: Width D = 122.0 mm, Thickness dn = 25.0 mm, Lambda = 0.022

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	Limestone				
	Main construction	150	1.7000	0.0882	100.00
Layer 2	Concrete, medium density				
	Main construction	100	1.3500	0.0741	100.00
Layer 3	Thermafloor TF70 zero ODP				
	Main construction	100	0.0220	4.5455	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 4	Floorboards				
	Main construction	22	0.1300	0.1692	100.00
Int surface				0.1700	

Total resistance: Upper limit = 4.877 m² K/W Lower limit = 4.877 m² K/W Average = 4.877 m² K/W
 Total correction = 0.0087 m² K/W U-value (unrounded) = 0.16 W/m² K

Unheated space: None

Total thickness: 372 mm

U-value: 0.16 W/m² K

Kappa: n/a

Predicted Energy Performance Certificate & Overview Report

PREDICTED ENERGY ASSESSMENT



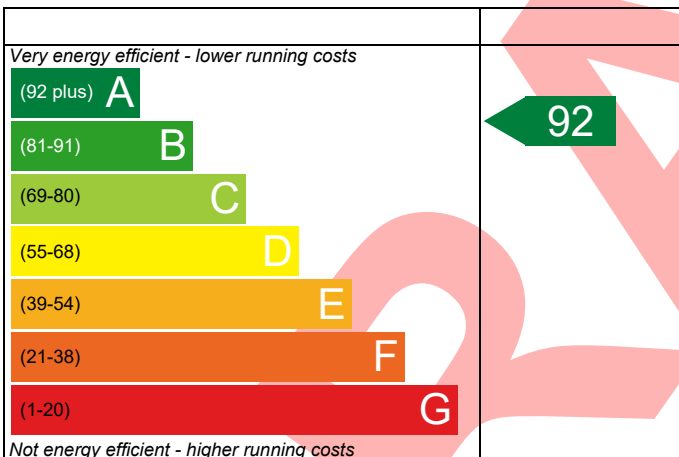
Bro Sion Wyn,
Chwillog,
Pwllheli

Dwelling type: House, Detached
Date of assessment: 18/11/2021
Produced by: Kerry Simpson
Total floor area: 120.96 m²

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

The energy performance has been assessed using the Government approved SAP2012 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.

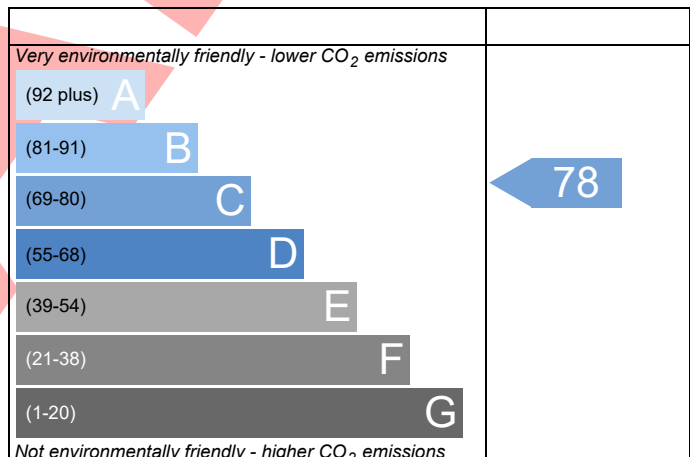
Energy Efficiency Rating



Wales EU Directive 2002/91/EC

The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO₂) Rating



Wales EU Directive 2002/91/EC

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

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

OVERVIEW REPORT



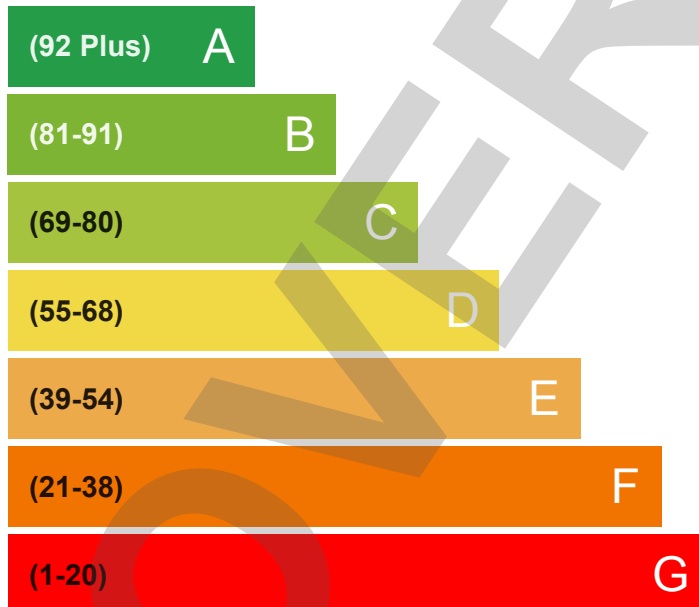
Dwelling Address	Bro Sion Wyn, Chwilog, Pwllheli
Report Date	18/11/2021
Property Type	House, Detached
Floor Area [m ²]	121

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.

Most energy efficient - lower running costs



CURRENT

92

POTENTIAL

94

Least energy efficient- higher running costs

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good
Feature	Description	Energy Performance		
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good		
Roof	Average thermal transmittance 0.12 W/m ² K	Very Good		
Floor	Average thermal transmittance 0.16 W/m ² K	Very Good		
Windows	High performance glazing	Very Good		
Main heating	Electric storage heaters	Poor		
Main heating controls	Automatic charge control	Average		
Hot water	Electric immersion, off-peak	Poor		
Lighting	Low energy lighting in all fixed outlets	Very Good		
Air tightness	Air permeability 5.0 m ³ /h.m ² (assumed)	Good		

Primary Energy use

The primary energy use for this property per year is 121 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling



The estimated CO₂ rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The estimated CO₂ emissions for this dwellings is: **2.5** per year

With the recommended measures the potential CO₂ emissions could be: **2.0** per year

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measure	Typical Yearly Saving	Potential Rating after measure installed	Cumulative savings (per year)	Cumulative Potential Rating
Solar water heating	£104		£104	

Estimated energy use and potential savings

Estimated energy cost for this property over a year

£294

Over a year you could save

£104

Heating use in this property

Heating a property usually makes up the majority of energy costs. Where applicable, this table shows the energy that could be saved in this property by insulating the loft and walls, based on typical energy use.



Space Heating

6151

kWh per year



Water Heating

2050

kWh per year

The estimated cost and savings show how much the average household would spend in this property for heating, lighting and hot water. It is not based on how energy is used by the people living at the property.

Contacting the assessor and the accreditation scheme

Assessor contact details

Assessor name	Mrs. Kerry Simpson
Assessor's accreditation number	EES/024476
Email Address	kerry@barlingskwa.co.uk

Accreditation scheme contact details

Accreditation scheme	Elmhurst Energy Systems Ltd
Telephone	01522 797344
Email Address	kerry@barlingskwa.co.uk

Assessment details

Related party disclosure	No related party
Date of assessment	18/11/2021
Date of certificate	18/11/2021
Type of assessment	SAP, new dwelling