

Client : Alan Akmenkalns
C/o Michael Wood BIAT

Calculation : Thermal Check in Accordance with
Approved Document L1A (2013)



Calculation Ref : SAP/2022/003/01

Dwelling Address or House Type :

The Cottage, Highground Lane, Barnham, PO22 0BT

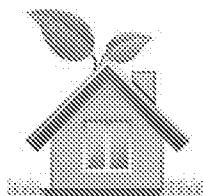
Building Regulation L1(a)(i) Compliance

Target Emissions Rate (CO₂)	17.52
Dwelling Emissions Rate (CO₂)	-3.68
Percentage improvement in Fabric Efficiency	121.00
Dwelling Emissions ≤ Target Emissions, therefore :	PASS

Target Fabric Energy Efficiency	58.30
Actual Fabric Energy Efficiency	53.20
Actual ≤ Target, therefore :	PASS

SAP Energy Rating	105
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The risk of solar over heating has been assessed as : and therefore complies with ADL1A, paragraph 2.40	Medium
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Calculation By : Ian Sheppard (QUID207615)

Thermal Solutions

21 Lincoln Avenue, Rose Green, Bognor Regis, West Sussex, PO21 3EJ



Dwelling Address/House Type : The Cottage, Highground Lane, Barnham, PO22 0BT

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CONSTRUCTION & INSULATION	U-Value
<u>External wall 1</u> 16mm render, 100mm Hemelite Standard block, 50mm clear cavity, membrane, 9mm OSB3, 140 x 38mm timber frame at 400mm centres with 120mm Celotex XR4000 between, 37.5mm Celotex PL4000 over both (25 + 12.5mm laminate) Heat capacity = $0.0125 \times 700 = 8.75$	0.18
<u>External wall 2 - stud below rafter line</u> Tiles, battens, felt, rafters, vented loft void, nominal 100 x 50mm timber studs with 100mm Celotex GA4000 between and a further 37.5mm Celotex PL4000 laid over - U value includes $R_u = 0.50$ for dual heat flow condition - Heat capacity = 8.75	0.21
<u>Roof 1 - horizontal ceiling over first floor and ground floor bedroom 2</u> Tiles, battens, felt, rafters, vented void, 200mm Knauf Loft Roll 44 cross laid over nominal 150 x 50mm timber joists with a further 200mm Knauf Earthwool Loft Roll 44 between the joists, 12.5mm plasterboard to horizontal soffit Heat capacity = $0.0125 \times 700 = 8.75$	0.12
<u>Roof 2 - sloping ceiling</u> Tiles, battens, felt, 150 x 50mm rafters with 100mm Celotex GA4000 between and 37.5mm Celotex PL4000 under both, Heat capacity = $0.0125 \times 700 = 8.75$	0.22
<u>Roof 3 - eaves void over ground floor</u> Tiles, battens, felt, rafters, vented void, 200mm Knauf Loft Roll 44 cross laid over nominal 200 x 50mm timber joists with a further 200mm Knauf Earthwool Loft Roll 44 between the joists, 12.5mm plasterboard to horizontal soffit. Heat capacity = $0.0125 \times 700 = 8.75$ - U value includes $R_u = 0.50$ for dual heat flow	0.10
<u>Ground Floor</u> 75mm screed, 100mm concrete slab, 120mm Celotex XR4000 insulation, hardcore over ground - Heat capacity = $0.075 \times 1200 = 90$ Heat capacity = $(0.075 \times 1200) + (0.025 \times 2300) = 147.50$	0.15
<u>Stud partitions</u> Timber studs with 12.5mm plasterboard both sides. Heat capacity = 8.75	0.00
<u>Upper floor</u> 22mm floorboards, timber joists, 12.5mm plasterboard heat capacity as floor = $0.022 \times 1.6 \times 500 = 17.6$ - As ceiling = $700 \times 0.0125 = 8.75$	0.00
<u>Windows and French Doors</u> UPVc frame, double glazed with low "E" glass. To achieve U value as shown	1.40
<u>Front door and sidelight</u> UPVc composite type door - door and frame to achieve average U value as shown - glazing low "E" glass etc Area of glazing in door less than 30% of door area	1.40
<u>Velux</u> Standard double glazed units with U value as shown and $U_g = 1.10$	1.30
The above notes may not include all elements, such as membranes or vapour barriers	

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<u>Heating, Orientation & Ventilation</u>	
<u>Primary Space Heating</u> Worcester Greenstar 18Ri condensing boiler using mains gas. Servig only underfloor heating at ground floor and radiators at first floor Boiler SEDBUK rating as sown (2009 definition)	<u>SEDBUK</u> 88.8%
<u>Heating Controls :</u> Full time and temperature zone controls with boiler interlock	
<u>Hot Water</u> By the PV panels and immersion heaters in a 210 litre Megaflo Eco indirect storage cylinder (in heated space) - cylinder to include timer and thermostat and primary pipework insulation - factory cylinder insulation with standing heat loss of 1.57 kW.h per day	
<u>Photovoltaic Panels</u> To provide 7.29 kW.h peak power, laid on South East facing roof at 45 degrees - assumed 18 panels provided	
<u>Orientation and Shading :</u> Front elevation faces North West with default zero sides sheltered with average overshadowing.	
<u>Air Permeability & Ventilation</u> Air permeability taken as 5.0 m ³ /hr/m ² . Natural trickle ventilation with 4 intermittant extract fans	
<u>Internal Lighting</u> 100% of internal lights are low energy type	

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Thermal Bridging

Thermal bridging at openings and junctions of external walls with roofs & floors etc, are assumed to comply with details below. An appropriate system will be set in place by the builder to monitor and confirm their implementation - this system to be agreed with Building Control

The application of the details must also be co-ordinated by a responsible person

<u>Item</u>	<u>Junction in or with external walls 1 and 2</u>	<u>ψ value</u>
E2	External walls and lintels - detail TFW - WD - 01	0.30
E3	External walls and cills - detail TFW - WD - 02	0.04
E4	External walls and reveals - detail TFW - WD - 03	0.05
E5	External wall 1 and ground floor - detail TFW - GF - 02	0.16
E6	External walls and first floor - detail TFW - IF - 01	0.07
E10	Roof eaves insulation at rafters - detail TFW - RE - 04	0.06
E11	Roof eaves insulation at joists - detail TFW - RE - 02	0.04
E12	Gable walls and roof insulation at joists - detail TFW - RG - 01	0.24
E13	Gable walls and roof insulation at rafters - detail TFW - RG - 03	0.04
E16	External corners - detail TFW - EW - 01	0.09

The Accredited Construction Details may be found on the link below

<http://www.planningportal.gov.uk/buildingregulations/approveddocuments/partl/bcassociateddocuments9/acd>

The following junctions have no accredited details, or have been deemed unpractical and so a default linear heat loss will be used, in accordance with Table K - The principles of minimising thermal bridging should still be followed

<u>Item</u>	<u>Junctions in loft room</u>	<u>ψ value</u>
R6	Roof 1 and 2	0.06
R8	External stud walls and sloping ceilings	0.06
E17	Internal corners	0.00

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ACTUAL ELEMENT AREAS

GROUND FLOOR $(5.85 \times 10.52) + (2.91 \times 3.42) = 71.49 \text{ m}^2$

U PERIMETRE $13.94 + 5.85 + 19.79 = 39.58 \text{ m}$

FIRST FLOOR $(2.40 \times 1.26) + (4.00 \times 9.26) + (0.65 \times 3.12) = 42.09 \text{ m}^2$

FIRST FLOOR AVH $((17.25 \times 2.54) + (0.42 \times 2.38) + (0.55 \times 2.32) + (8.33 \times 2.09))$
 $(13.52 \times 1.81) + (2.01 \times 0.76)) / 42.09 = 2.13 \text{ m}$

ROOFS

Roof 1

$(1.64 \times 10.52) + (2.91 \times 3.42) = 27.21 \text{ m}^2$

Roof 2

$$\left(\frac{(42.09 \times 1.00) + (1.64 \times 10.52)}{\cos 45} \right) - 2.76 = 32.36 \text{ m}^2$$

Roof 3

$71.49 - 42.09 - 9.95 = 19.45 \text{ m}^2$

WINDOWS AND

FRENCH DOORS

In GF wall 1

$(2.67 \times 2.25) + (5.90 \times 1.35) + (1.16 \times 1.09) = 15.24 \text{ m}^2$

In FF wall 1

$1.16 \times 1.09 = 1.26 \text{ m}^2$

Total

$= 16.50 \text{ m}^2$

facing front

$2.36 \times 1.35 = 3.19 \text{ m}^2$

facing back

$(1.18 \times 1.35) + (1.16 \times 1.09) = 2.86 \text{ m}^2$

facing left

$(2.36 \times 1.35) + (0.58 \times 1.09) = 3.82 \text{ m}^2$

facing right

$(2.67 \times 2.25) + (0.58 \times 1.09) = 6.64 \text{ m}^2$

Total

$= 16.51 \text{ m}^2$

SINGLE DOOR

Entrance Door

$0.86 \times 2.10 = 1.81 \text{ m}^2$

Entrance sidelight

$0.32 \times 2.10 = 0.67 \text{ m}^2$

ROOF LIGHTS

Velux - facing front in roof 2

$0.78 \times 1.18 \times 3.00 = 2.76 \text{ m}^2$

Project Information

Building type	Detached house		
Reference	SAP/2022/003/01		
Date	31 January 2022		
Client	Alan Akmenkalns	Project	The Cottage
	C/o Michael Wood BIAT		Highground Lane
			Barnham
			PO22 0BT

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.05.058, printed on 03/02/2022 at 10:23:58

New dwelling as designed

1 TER and DER

Fuel for main heating system: Gas (mains) (fuel factor = 1.00)

Target Carbon Dioxide Emission Rate	TER = 17.52	
Dwelling Carbon Dioxide Emission Rate	DER = -3.68	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	TFEE = 58.3	
Dwelling Fabric Energy Efficiency (DFEE)	DFEE = 53.2	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

<u>Element</u>	<u>Average</u>	<u>Highest</u>	
Wall	0.19 (max. 0.30)	0.21 (max. 0.70)	OK
Floor	0.15 (max. 0.25)	0.15 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.22 (max. 0.35)	OK
Openings	1.39 (max. 2.00)	1.40 (max. 3.30)	OK

3 Air permeability

Air permeability at 50 pascals:	5.00	
Maximum :	10.00	OK

4 Heating efficiency

Main heating system:

Boiler and underfloor heating, mains gas

Source of efficiency:

Worcester Greenstar

from boiler database

Worcester Greenstar 18Ri

Efficiency: 88.8% SEDBUK2009

Minimum: 88.0%

OK

Main heating system 2:

Boiler and radiators, mains gas

Source of efficiency:

Worcester Greenstar

from boiler database

Worcester Greenstar 18Ri

Efficiency: 88.8% SEDBUK2009

Minimum: 88.0%

OK

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage

Manufacturer's declared cylinder loss factor (kWh/day)

1.57

Permitted by DBSCG

2.30

OK

Primary pipework insulated

Yes

OK

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls

Time and temperature zone control

OK

Cylinderstat - Yes

OK

Boiler Interlock

Yes

OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%

Minimum: 75.0%

OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (South East England):

Medium

OK

OK

Based on:

Thermal mass parameter :

130.33

Overshading :

Average or unknown (20-60 % sky blocked)

Orientation : NorthWest

Ventilation rate :

4.00

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Pitched roofs insulated between joists U-value 0.10 W/m²K

Pitched roofs insulated between joists U-value 0.12 W/m²K

Photovoltaic array

Predicted Energy Assessment

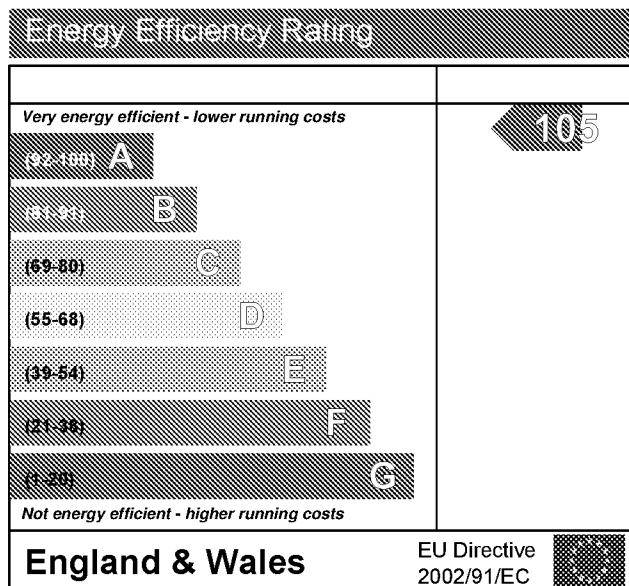
The Cottage
Highground Lane
Barnham
PO22 0BT
Ref: SAP/2022/003/01

Dwelling type:
Date of assessment:
Produced by
Total floor area:

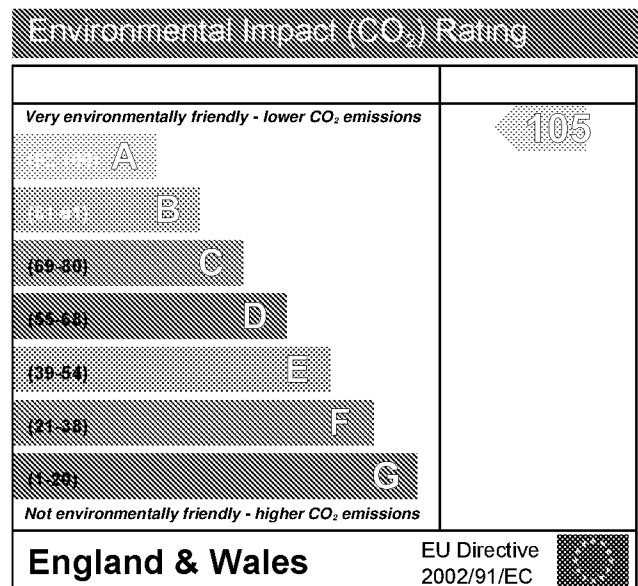
Detached house
3 February 2022
Thermal Solutions
114 m²

This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2012 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO₂) emissions.



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.



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.