

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

Date: Tue 02 Apr 2024 11:20:31

Project Information			
Assessed By	Kevin Hopton	Building Type	House, Detached
OCDEA Registration	EES/005002	Assessment Date	2024-04-02

Dwelling Details			
Assessment Type	As designed	Total Floor Area	227 m ²
Site Reference	23-016	Plot Reference	00002
Address	Timber Cottage Lumley Road, Southbourne, PO10 8AF		

Client Details	
Name	Mr & Mrs Doye
Company	n/a
Address	Timber Cottage, Lumley Road, Southbourne, PO10 8AF

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	7.21 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	3.19 kgCO ₂ /m ²	OK	
1b Target primary energy rate and dwelling primary energy			
Target primary energy	38.05 kWh _{PE} /m ²		
Dwelling primary energy	34.34 kWh _{PE} /m ²	OK	
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	38.0 kWh/m ²		
Dwelling fabric energy efficiency	36.7 kWh/m ²	OK	

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m ² K]	Dwelling average U-Value [W/m ² K]	Element with highest individual U-Value	
External walls	0.26	0.15	Walls (3) (0.16)	OK
Party walls	0.2	N/A	N/A	N/A
Curtain walls	1.6	N/A	N/A	N/A
Floors	0.18	0.12	Heatloss Floor 2 (0.18)	OK
Roofs	0.16	0.11	Roof (1) (0.11)	OK
Windows, doors, and roof windows	1.6	1.41	Front elevation (1.6)	OK
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	Net area [m ²]	U-Value [W/m ² K]
Exposed wall: Walls (1)	89.43515	0.15
Exposed wall: Walls (2)	52.15	0.14 (!)
Exposed wall: Walls (3)	0.9213	0.16
Exposed wall: Walls (4)	12.32	0.16
Ground floor: Heatloss Floor 1, Heatloss Floor 1	116.7	0.12
Upper floor: Heatloss Floor 2, Heatloss Floor 2	5.69	0.18
Exposed roof: Roof (1)	61.3056	0.11
Exposed roof: Roof (2)	51.1668	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
Front elevation, Front door TBC client	2.142	South West	N/A	1.6
Front, Windows TBC by client	1.53	South West	0.7	1.4
Front, Windows TBC by client	1.53	South West	0.7	1.4
Front, Windows TBC by client	1.060875	South West	0.7	1.4
Front, Windows TBC by client	1.060875	South West	0.7	1.4
Front, Windows TBC by client	5.7525	South West	0.7	1.4
Front, Windows TBC by client	2.05435	South West	0.7	1.4
Front, Velux rooflight	0.7644	South West	0.7	1.3
Rear elevation, Windows TBC by client	1.5436	North East	0.7	1.4

Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
Rear elevation, Windows TBC by client	2.172	North East	0.7	1.4
Rear elevation, Windows TBC by client	0.9555	North East	0.7	1.4
Rear, Windows TBC by client	2.05435	North East	0.7	1.4
Rear-angled window, Windows TBC by client	10.87	North East	0.7	1.4
Rear, Velux rooflight	0.7644	North East	0.7	1.3
Rear, Glazed pair TBC client	3.801	North East	0.7	1.4
Side elevation, Windows TBC by client	1.035	North West	0.7	1.4
Side, Bullseye window TBC clien	0.35	North West	0.7	1.4
Side, Utility door TBC client	1.911	North West	N/A	1.6
Side elevation, Velux rooflight	0.7644	South East	0.7	1.3
Side, Velux rooflight	0.7644	South East	0.7	1.3
Side, Windows TBC by client	1.035	South East	0.7	1.4
Side, Windows TBC by client	0.9555	South East	0.7	1.4

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))

Building part 1 - Main Dwelling: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.095	Ultima 90/50(T W55/TW55)
External wall	E3: Sill	Calculated by person with suitable expertise	0.044	Ultima 90/50(T W55/TW55)
External wall	E4: Jamb	Calculated by person with suitable expertise	0.066	Ultima 90/50(T W55/TW55)
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.052	Ultima 90/50(T W55/TW55)
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0.062	Ultima 90/50(T W55/TW55)
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.032 (!)	Ultima 90/50(T W55/TW55)
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.034 (!)	Ultima 90/50(T W55/TW55)
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.022 (!)	Ultima 90/50(T W55/TW55)
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.001 (!)	Ultima 90/50(T W55/TW55)
Roof	R1: Head of roof window	Calculated by person with suitable expertise	0.069	Ultima 90/50(T W55/TW55)
Roof	R2: Sill of roof window	Calculated by person with suitable expertise	0.069	Ultima 90/50(T W55/TW55)
Roof	R3: Jamb of roof window	Calculated by person with suitable expertise	0.075	Ultima 90/50(T W55/TW55)
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.049	Ultima 90/50(T W55/TW55)
External wall	E11: Eaves (insulation at rafter level)	Calculated by person with suitable expertise	0.036 (!)	Ultima 90/50(T W55/TW55)
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.044	Ultima 90/50(T W55/TW55)
External wall	E13: Gable (insulation at rafter level)	Calculated by person with suitable expertise	0.044	Ultima 90/50(T W55/TW55)
Roof	R4: Ridge (vaulted ceiling)	Calculated by person with suitable expertise	0.02 (!)	Ultima 90/50(T W55/TW55)
Roof	R8: Roof to wall (rafter)	Calculated by person with suitable expertise	0.027 (!)	Ultima 90/50(T W55/TW55)
Roof	R6: Flat ceiling	Calculated by person with suitable expertise	0.004 (!)	Ultima 90/50(T W55/TW55)
External wall	E24: Eaves (insulation at ceiling level - inverted)	SAP table default	0.15	

3 Air permeability (better than typically expected values are flagged with a subsequent (!))

Maximum permitted air permeability at 50Pa	8 m ³ /hm ²	
Dwelling air permeability at 50Pa	3 m ³ /hm ² , Design value (!)	OK
Air permeability test certificate reference		

4 Space heating		
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity		
Efficiency	219.3%	
Emitter type	Underfloor	
Flow temperature		
System type	Air source heat pump	
Manufacturer		
Model		
Commissioning		
Secondary heating system: N/A		
Fuel	N/A	
Efficiency	N/A	
Commissioning		
5 Hot water		
Cylinder/store - type: Cylinder		
Capacity	210 litres	
Declared heat loss	N/A	
Primary pipework insulated	Yes	
Manufacturer		
Model		
Commissioning		
Waste water heat recovery system 1 - type: N/A		
Efficiency		
Manufacturer		
Model		
6 Controls		
Main heating 1 - type: Time and temperature zone control by arrangement of plumbing and electrical services		
Function		
Ecodesign class		
Manufacturer		
Model		
Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		
7 Lighting		
<i>Minimum permitted light source efficacy</i>	75 lm/W	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	
8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
<i>Maximum permitted specific fan power</i>	1.5 W/(l/s)	
Specific fan power	1.16 W/(l/s)	OK
<i>Minimum permitted heat recovery efficiency</i>	73%	
Heat recovery efficiency	85%	OK
Manufacturer/Model	250R DC	
Commissioning		
9 Local generation		
Technology type: Photovoltaic system (1)		
Peak power	1.2 kWp	
Orientation	South East	
Pitch	30°	
Overshading	None or very little	
Manufacturer		
MCS certificate		
10 Heat networks		
N/A		
11 Supporting documentary evidence		
N/A		

12 Declarations**a. Assessor Declaration**

This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.

Signed:

Assessor ID:

Name:

Date:

b. Client Declaration

N/A

Summary for Input Data



Property Reference	23-016		Issued on Date	02/04/2024	
Assessment Reference	00002	Prop Type Ref			
Property	Timber Cottage, Lumley Road, Southbourne, West Sussex, PO10 8AF				
SAP Rating	83 B	DER	3.19	TER	7.21
Environmental	97 A	% DER < TER			55.76
CO ₂ Emissions (t/year)	0.61	DFEE	36.74	TFEE	38.02
Compliance Check	See BREL	% DFEE < TFEE			3.37
% DPER < TPER	9.75	DPER	34.34	TPER	38.05
Assessor Details	Mr. Kevin Hopton			Assessor ID	P190-0001
Client	23-016, Mr & Mrs Doye				

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

Orientation	Southwest
Property Tenure	1
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	2
3.0 Date Built	2024
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	No
Smart gas meter fitted	No

7.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground floor:	48.30 m	116.70 m ²	2.40 m
	1st Storey:	49.30 m	110.30 m ²	2.78 m

8.0 Living Area	27.90	m ²
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Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
Brick/flint cladding	Timber Frame	Timber framed wall (one layer of plasterboard)	0.15	9.00	115.92	89.44	0.00	None	26.48	Enter Gross Area
Cement board onto block	Timber Frame	Timber framed wall (one layer of plasterboard)	0.14	9.00	63.37	52.15	0.00	None	11.22	Enter Gross Area
Dormers-cement board	Timber Frame	Timber framed wall (one layer of plasterboard)	0.16	9.00	5.03	0.92	0.00	None	4.11	Enter Gross Area
Abuts unheated space	Timber Frame	Timber framed wall (one layer of plasterboard)	0.16	9.00	12.32	12.32	0.00	None	0.00	Enter Gross Area

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall GF	Plasterboard on timber frame	9.00	197.76
Internal Wall FF	Plasterboard on timber frame	9.00	116.32

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
Upper roof void	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	62.07	61.31	None	0.00	Enter Gross Area	0.76
222 rafters @600c/c	External Slope Roof	Plasterboard, insulated slope	0.11	9.00	53.46	51.17	None	0.00	Enter Gross Area	2.29

Description	Storey	Construction	Area (m ²)
Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	106.40

Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
Heatloss Floor 1	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.12	None	0.00	75.00	116.70
Heatloss Floor 2	Exposed Floor - Timber	+1	Timber exposed floor, insulation between joists	0.18	None	0.00	0.00	5.69

Summary for Input Data



11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1		Plasterboard ceiling, carpeted chipboard floor	9.00	106.40

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows TBC by client	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40
Velux rooflight	Manufacturer	Roof Window	Double Low-E Soft 0.1			0.63		0.70	1.30
Front door TBC client	Manufacturer	Solid Door							1.60
Glazed pair TBC client	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40
Utility door TBC client	Manufacturer	Solid Door							1.60
Bullseye window TBC client	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Front elevation	Front door TBC client	Brick/flint cladding	South West	2.14	
Front	Windows TBC by client	Brick/flint cladding	South West	10.93	
Front	Windows TBC by client	Dormers-cement board	South West	2.05	
Front	Velux rooflight	222 rafters @600c/c	South West	0.76	38
Rear elevation	Windows TBC by client	Brick/flint cladding	North East	4.67	
Rear	Windows TBC by client	Dormers-cement board	North East	2.05	
Rear-angled window	Windows TBC by client	Cement board onto block	North East	10.87	
Rear	Velux rooflight	222 rafters @600c/c	North East	0.76	38
Rear	Glazed pair TBC client	Brick/flint cladding	North East	3.80	
Side elevation	Windows TBC by client	Brick/flint cladding	North West	1.03	
Side	Bullseye window TBC client	Cement board onto block	North West	0.35	
Side	Utility door TBC client	Brick/flint cladding	North West	1.91	
Side elevation	Velux rooflight	Upper roof void	South East	0.76	0
Side	Velux rooflight	222 rafters @600c/c	South East	0.76	38
Side	Windows TBC by client	Brick/flint cladding	South East	1.99	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E2 Other lintels (including other steel lintels)	Independently assessed	21.34	0.10	0.10 Ultima 90/50(TW55/TW55)	Yes
E3 Sill	Independently assessed	17.60	0.04	0.04 Ultima 90/50(TW55/TW55)	No
E4 Jamb	Independently assessed	47.31	0.07	0.07 Ultima 90/50(TW55/TW55)	Yes
E5 Ground floor (normal)	Independently assessed	48.30	0.05	0.05 Ultima 90/50(TW55/TW55)	Yes
E6 Intermediate floor within a dwelling	Independently assessed	49.30	0.06	0.06 Ultima 90/50(TW55/TW55)	Yes
E16 Corner (normal)	Independently assessed	30.40	0.03	0.03 Ultima 90/50(TW55/TW55)	No
E16 Corner (normal)	Independently assessed	9.60	0.03	0.03 Ultima 90/50(TW55/TW55)	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	11.20	-0.02	-0.02 Ultima 90/50(TW55/TW55)	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	11.20	-0.00	-0.00 Ultima 90/50(TW55/TW55)	No
R1 Head of roof window	Independently assessed	2.34	0.07	0.07 Ultima 90/50(TW55/TW55)	No
R2 Sill of roof window	Independently assessed	2.34	0.07	0.07 Ultima 90/50(TW55/TW55)	No
R3 Jamb of roof window	Independently assessed	5.88	0.07	0.07 Ultima 90/50(TW55/TW55)	No
E10 Eaves (insulation at ceiling level)	Independently assessed	6.40	0.05	0.05 Ultima 90/50(TW55/TW55)	No
E11 Eaves (insulation at rafter level)	Independently assessed	11.59	0.04	0.04 Ultima 90/50(TW55/TW55)	No
E12 Gable (insulation at ceiling level)	Independently assessed	9.14	0.04	0.04 Ultima 90/50(TW55/TW55)	No
E13 Gable (insulation at rafter level)	Independently assessed	13.34	0.04	0.04 Ultima 90/50(TW55/TW55)	No
R4 Ridge (vaulted ceiling)	Independently assessed	5.00	0.02	0.02 Ultima 90/50(TW55/TW55)	No
R8 Roof to wall (rafter)	Independently assessed	9.99	0.03	0.03 Ultima 90/50(TW55/TW55)	No
R6 Flat ceiling	Independently assessed	7.62	0.00	0.00 Ultima 90/50(TW55/TW55)	No
E24 Eaves (insulation at ceiling level - inverted)	Table K1 - Default	11.10	0.15	0.15	No

Y-value W/m²K

18.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Test Method

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

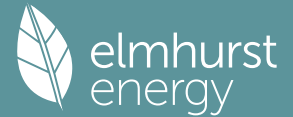
Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Summary for Input Data



Configuration	4
Manufacturer SFP	1.16
Duct Type	Rigid
MVHR Efficiency	85.00
Wet Rooms	4
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System	No
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22.0 Lighting

No Fixed Lighting	No
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Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	8	640	14

24.0 Main Heating 1

SAP table		
Description	Air source heat pump	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	224	
In Winter	219.30	
In Summer	190.40	
Controls SAP Code	2207	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Unknown	

25.0 Main Heating 2	None
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26.0 Heat Networks	None
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28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
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
Cold Water Source	From mains
Bath Count	1
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

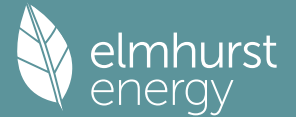
28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
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28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes

Summary for Input Data



Cylinder In Heated Space	<input type="text" value="Yes"/>
Independent Time Control	<input type="text" value="Yes"/>
Insulation Type	<input type="text" value="Foam"/>
Insulation Thickness Type	<input type="text" value="80 mm"/>
Cylinder Volume	<input type="text" value="210.00"/> L
Pipes insulation	<input type="text" value="Fully insulated primary pipework"/>
In Airing Cupboard	<input type="text" value="No"/>

31.0 Thermal Store

32.0 Photovoltaic Unit

Export Capable Meter?	<input type="text" value="Yes"/>
Connected To Dwelling	<input type="text" value="Yes"/>
Diverter	<input type="text" value="No"/>
Battery Capacity [kWh]	<input type="text" value="0.00"/>

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
1.20	South East	30°	None Or Little		No	1.00		

34.0 Small-scale Hydro

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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
£4,000 - £6,000	£96	B 84	A 97
		0	0
		0	0