Building Regulations England Part L (BREL) Compliance Report

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

Date: Tue 31 Oct 2023 14:42:26

Project Information			
Assessed By	Kevin Hopton	Building Type	House, Detached
OCDEA Registration	EES/005002	Assessment Date	2023-10-31

Dwelling Details			
Assessment Type	As designed	Total Floor Area	235 m^2
Site Reference	23-016	Plot Reference	00001
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	*7.8 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	2.8 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*41.1 kWh_{PE}/m^2*	
Dwelling primary energy	31.1 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*39.8 kWh/m^2*	
Dwelling fabric energy efficiency	39.4 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**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*	0.13	Dining floor above porch (0.18)	OK
Roofs	*0.16*	0.12	Roof (2) (0.12)	OK
Windows, doors, and roof windows	*1.6*	1.49	Front elevation (1.6)	OK
Rooflights	*2.2*	1.3	Rear, North East (1.3)	OK

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Walls (1)	102.42955	0.15
Exposed wall: Walls (2)	54.831	0.14 **(!)**
Exposed wall: Walls (3)	2.79	0.16
Ground floor: Main ground floor, Main ground floor	111.08	0.12
Upper floor: Dining floor above porch, Dining floor above porch	13.16	0.18
Exposed roof: Roof (1)	37.31	0.11
Exposed roof: Roof (2)	138.341	0.12

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
Front elevation, Front door TBC by client	2.142	South West	N/A	1.6
Front, Windows TBC by client	0.7098	South West	0.7	1.4
Front, Windows TBC by client	0.7098	South West	0.7	1.4
Front, Windows TBC by client	1.7676	South West	0.7	1.4
Front, Windows TBC by client	2.172	South West	0.7	1.4
Front, Windows TBC by client	2.172	South West	0.7	1.4
Front, Windows TBC by client	0.9555	South West	0.7	1.4
Front, BI-folds TBC by client	8.526	South West	0.7	1.6

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
Rear elevation, BI-folds TBC by client	5.691	North East	0.7	1.6
Rear, Windows TBC by client	1.19175	North East	0.7	1.4
Rear, Windows TBC by client	1.9005	North East	0.7	1.4
Rear, Windows TBC by client	1.0215	North East	0.7	1.4
Rear, Velux rooflight	0.429	North East	0.7	1.3
Rear, Windows TBC by client	2.172	North East	0.7	1.4
Rear, Windows TBC by client	0.54	North East	0.7	1.4
Rear, Windows TBC by client	0.54	North East	0.7	1.4
Side elevation, Windows TBC by client	1.2285	South East	0.7	1.4
Side elevation, Windows TBC by client	1.2285	South East	0.7	1.4
Side elevation, Windows TBC by client	0.9555	North West	0.7	1.4
Side elevation, Windows TBC by client	0.9555	North West	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	0.097	ULTIMA90/50(TW55)
External wall	E3: Sill	Calculated by person with suitable expertise	0.045	ULTIMA90/50(TW55)
External wall	E4: Jamb	Calculated by person with suitable expertise	0.066	ULTIMA90/50(TW55)
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.049	ULTIMA90/50(TW55)
Roof	R1: Head of roof window	Calculated by person with suitable expertise	0.045	Velux calcs
Roof	R2: Sill of roof window	Calculated by person with suitable expertise	0.054	Velux calcs
Roof	R3: Jamb of roof window	Calculated by person with suitable expertise	0.061	Velux calcs
External wall	E20: Exposed floor (normal)	SAP table default	0.32	Porch perimeter
External wall	E21: Exposed floor (inverted)	SAP table default	0.32	Porch inverted junction
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0.072	ULTIMA90/50(TW55)
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.049	ULTIMA90/50(TW55)
External wall	E11: Eaves (insulation at rafter level)	Calculated by person with suitable expertise	0.036 **(!)**	ULTIMA90/50(TW55)
External wall	E13: Gable (insulation at rafter level)	Calculated by person with suitable expertise	0.048	ULTIMA90/50(TW55)
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.032 **(!)**	ULTIMA90/50(TW55)
Roof	R6: Flat ceiling	Calculated by person with suitable expertise	0.005 **(!)**	ULTIMA90/50(TW55)
Roof	R7: Flat ceiling (inverted)	SAP table default	0.12	
Roof	R9: Roof to wall (flat ceiling)	SAP table default	0.32	
Roof	R4: Ridge (vaulted ceiling)	Calculated by person with suitable expertise	0.019 **(!)**	ULTIMA90/50(TW55)

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: N/A		
Capacity	N/A	
Declared heat loss	N/A	
Primary pipework insulated	N/A	
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: N/A		
Manufacturer		
Model		

7 Lighting		
Minimum permitted light source efficacy	*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		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	1.16 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	85%	OK
Manufacturer/Model	250R DC	
Commissioning		

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	2 kWp
Orientation	South East
Pitch	45°
Overshading	1 (overshading factor calculated according to MCS)
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

elmhurst energy

Property Reference	23-016	**Issued on Date**	31/10/2023
Assessment Reference	00001	**Prop Type Ref**	
Property	Timber Cottage, Lumley Road, Southbourne, West Sussex, PO10 8AF		

SAP Rating	84 B	**DER**	2.80	**TER**	7.80
Environmental	97 A	**% DER < TER**			64.10
CO_2 Emissions (t/year)	0.53	**DFEE**	39.36	**TFEE**	39.82
Compliance Check	See BREL	**% DFEE < TFEE**			1.16
% DPER < TPER	24.32	**DPER**	31.10	**TPER**	41.10

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 Tenture	1
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	2
3.0 Date Built	2023
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	Yes
Smart gas meter fitted	Yes

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	44.61 m	111.08 m²	2.42 m
1st Storey:	49.11 m	124.15 m²	3.17 m

8.0 Living Area 27.80 m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
Brick cladding	Timber Frame	Timber framed wall (one layer of plasterboard)	0.15	9.00	121.54	102.43	0.00	None	19.11	Enter Gross Area
Cement board onto block	Timber Frame	Timber framed wall (one layer of plasterboard)	0.14	9.00	72.30	54.83	0.00	None	17.47	Enter Gross Area
Dormer cheek brick slips	Timber Frame	Timber framed wall (one layer of plasterboard)	0.16	9.00	2.79	2.79	0.00	None	0.00	Enter Nett Area

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall GF	Plasterboard on timber frame	9.00	198.86
Internal Wall FF	Plasterboard on timber frame	9.00	170.21

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
Upper roof void	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	37.31	37.31	None	0.00	Enter Gross Area	0.00
222 rafters@400c/c	External Slope Roof	Plasterboard, insulated slope	0.12	9.00	138.77	138.34	None	0.00	Enter Gross Area	0.43

10.2 Internal Ceilings

Description	Storey	Construction	Area (m²)
Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	106.50

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Main ground floor	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.12	None	0.00	75.00	111.08
Dining floor above porch	Exposed Floor - Timber	+1	Timber exposed floor, insulation between joists	0.18	None	0.00	20.00	13.16

11.2 Internal Floors

Summary for Input Data

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1		Plasterboard ceiling, carpeted chipboard floor	9.00	105.60

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
BI-folds TBC by client	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.60
Windows TBC by client	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40
Velux rooflight	Manufacturer	Roof Light	Double Low-E Soft 0.1			0.63		0.70	1.30
Front door TBC by client	Manufacturer	Solid Door							1.60
Boot room door TBC client	Manufacturer	Half Glazed Door	Double Low-E Soft 0.1			0.63		0.70	1.50

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Front elevation	Front door TBC by client	Brick cladding	South West	2.14	
Front	Windows TBC by client	Brick cladding	South West	8.49	
Front	BI-folds TBC by client	Cement board onto block	South West	8.53	
Rear elevation	BI-folds TBC by client	Cement board onto block	North East	5.69	
Rear	Windows TBC by client	Brick cladding	North East	4.11	
Rear	Velux rooflight	222 rafters@400c/c	North East	0.43	40
Rear	Windows TBC by client	Cement board onto block	North East	3.25	
Side elevation	Windows TBC by client	Brick cladding	South East	2.46	
Side elevation	Windows TBC by client	Brick cladding	North West	1.91	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	

17.0 Thermal Bridging	Calculate Bridges	

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted	Reference:	Imported
E2 Other lintels (including other steel lintels)	Independently assessed	24.90	0.10	0.10	ULTIMA90/50(TW55)	Yes
E3 Sill	Independently assessed	23.88	0.04	0.04	ULTIMA90/50(TW55)	Yes
E4 Jamb	Independently assessed	39.90	0.07	0.07	ULTIMA90/50(TW55)	No
E5 Ground floor (normal)	Independently assessed	44.61	0.05	0.05	ULTIMA90/50(TW55)	Yes
R1 Head of roof window	Independently assessed	0.55	0.04	0.04	Velux calcs	No
R2 Sill of roof window	Independently assessed	0.55	0.05	0.05	Velux calcs	No
R3 Jamb of roof window	Independently assessed	1.56	0.06	0.06	Velux calcs	No
E20 Exposed floor (normal)	Table K1 - Default	9.40	0.32	0.32	Porch perimeter	No
E21 Exposed floor (inverted)	Table K1 - Default	5.82	0.32	0.32	Porch inverted junction	No
E6 Intermediate floor within a dwelling	Independently assessed	39.90	0.07	0.07	ULTIMA90/50(TW55)	No
E10 Eaves (insulation at ceiling level)	Independently assessed	9.82	0.05	0.05	ULTIMA90/50(TW55)	No
E11 Eaves (insulation at rafter level)	Independently assessed	12.11	0.04	0.04	ULTIMA90/50(TW55)	No
E13 Gable (insulation at rafter level)	Independently assessed	17.00	0.05	0.05	ULTIMA90/50(TW55)	No
E16 Corner (normal)	Independently assessed	30.79	0.03	0.03	ULTIMA90/50(TW55)	No
R6 Flat ceiling	Independently assessed	17.17	0.01	0.01	ULTIMA90/50(TW55)	No
R7 Flat ceiling (inverted)	Table K1 - Default	4.95	0.12	0.12		No
R9 Roof to wall (flat ceiling)	Table K1 - Default	7.35	0.32	0.32		No
R4 Ridge (vaulted ceiling)	Independently assessed	11.21	0.02	0.02	ULTIMA90/50(TW55)	No

Y-value	0.04	W/m²K

18.0 Pressure Testing	Yes	
Designed AP_{50}	3.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500424
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)

Summary for Input Data

elmhurst energy

Duct Installation Specification	Level 1

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System	No

22.0 Lighting

No Fixed Lighting	No

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	8	640	13

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 Wood	
Flow Temperature	Unknown	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

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

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	None
In Airing Cupboard	No
32.0 Photovoltaic Unit	One Dwelling
Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate	Panel Manufacturer

Summary for Input Data

						Reference
2.00	South East	45°		Yes	1.00	

34.0 Small-scale Hydro None

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
			B 85	A 97
			0	0
			0	0