

Part L1A Compliance Assessment SAP Calculations

Pentangle Design

PRJ012279

27 April 2022



Part L1A Compliance Assessment

Summary

Briary Energy is an independent environmental consultancy with considerable experience in the renewable energy industry. We are a focused team of professionals committed to securing success for our clients. Our service combines the personal commitment of our staff with the best of modern practices and resources. We provide independent advice within all aspects of Part L of planning for the development industry including the energy sector.

Briary Energy take an integrated approach to the areas of renewables and other low-carbon energy technologies, offering services from Energy Feasibility Studies, Energy Consumption statements, Code for Sustainable Homes Assessments, SAP and SBEM Calculations, Pressure Testing and Daylight Calculations.

Pentangle Design has instructed Briary Energy to undertake SAP Calculations for Rockleigh Cottage.

This project comprises of 1 plot, where compliance will be sought under the Part L1A 2013 Regs using SAP 2012. The Standard Assessment Procedure (SAP) is the methodology used by the Government to assess and compare the energy and environmental performance of dwellings.

Its purpose is to provide accurate and reliable assessments of dwelling energy performances that are needed to underpin energy and environmental policy initiatives.

Project Status

SAP Compliance Achieved

Total Target Emission Rate:

7,390 kgCO₂ per year

Total Dwelling Emission Rate:

2,857 kgCO₂ per year

This shows an overall reduction of 4,533 kgCO₂ per year from the Target Emission Rate.
This is a 61.3% reduction overall.

Total CO₂ from Appliances:

2,807 kgCO₂ per year

Total CO₂ from Cooking:

195 kgCO₂ per year

Net Site CO₂ Emissions:

5,859 kgCO₂ per year

Specification

Description		U Value W/m ² K	Element	Specification	
Floors	Floor Type 1	0.10	Flr - Ground	Concrete, medium density 150mm,Kingspan Kooltherm K103 150mm,Screed 75mm	
Walls	Wall Type 1	0.14	WI - Block	Stranlite 4.2N 100mm,Standard cavity 10mm,Kingspan K107 115mm,Stranlite 4.2N 100mm,airspace/plaster dabs 15mm,Plasterboard 12.5mm,Plaster Skim 3mm	
	Wall Type 2	0.14	WI - Garage	Stranlite 4.2N 100mm,Standard cavity 10mm,Kingspan K106 115mm,Stranlite 4.2N 100mm,airspace/plaster dabs 15mm,Plasterboard 12.5mm,Plaster Skim 3mm	
	Wall Type 3	0.18	WI - Dormer	Plywood 18mm,Celotex XR4000 120mm,Celotex TB4000 25mm,Low Emissivity Cavity 20mm,Plasterboard 12.5mm,Plaster Skim 3mm	
	Wall Type 4	0.18	WI - Dormer Below Roof	Plywood 18mm,Celotex XR4000 120mm,Celotex TB4000 25mm,Low emissivity cavity 20mm,Plasterboard 12.5mm,Plaster Skim 3mm	
	Wall Type 5	0.14	WI - Render	Render - Cement and Sand 20mm,Stranlite 4.2N 100mm,Standard cavity 10mm,Kingspan K106 115mm,Stranlite 4.2N 100mm,airspace/plaster dabs 15mm,Plasterboard 12.5mm,Plaster Skim 3mm	
Roofs	Roof Type 1	0.13	Rf - Behind Stud	Mineral wool 150mm,Mineral wool 250mm,Plasterboard 12.5mm,Plaster Skim 3mm	
	Roof Type 2	0.22	Rf - Balcony	Plywood 18mm,Mineral wool 250mm,Plasterboard 12.5mm,Plaster Skim 3mm	
	Roof Type 3	0.15	Rf - Flat Roof Dormer	Plywood 18mm,Kooltherm K107 125mm,Kooltherm K18 Insulated Plasterboard (42.5mm) 42.5mm,Plaster Skim 3mm	
	Roof Type 4	0.17	Rf - Ins Rafter	Kooltherm K107 Pitched roof board (100mm) 100mm,Kooltherm K18 Insulated Plasterboard (52.5mm) 52.5mm,Plaster Skim 3mm	
	Roof Type 5	0.11	Rf - Ins Joist	Mineral wool 150mm,Mineral wool 150mm,Mineral wool 100mm,Plasterboard 12.5mm,Plaster Skim 3mm	
Openings	Roof Window	1.40	Manufacturer	Solar Factor 0.76, Frame Factor 0.72	
	Windows	1.40	Manufacturer	Solar Factor 0.76, Frame Factor 0.72	
	Solid Door	1.40	Manufacturer	Solar Factor 0.70, Frame Factor 0.72	
	Half Glazed Door	1.40	Manufacturer	Solar Factor 0.76, Frame Factor 0.72	
Specifics	Y Value	0.053		Airtightness m ³ /(hr.m ²)	5.01
	Thermal Mass	Calculated Thermal Mass		Mechanical Ventilation	Intermittent Fans
	Main Heating System	Grant AERONA3 HPID12R32		Water Heating	Cylinder Size 250l, Cylinder Loss - 2.16
	Heating Fuel	Electric		Renewables	N/A
	Controls	Time & Temp Zone		Additional Notes:	Wood Log Fire installed
	Low Energy Lighting	100%			

Construction Details

Below is the full list of construction details utilised by junction type within .

Junction Type	Detail Reference	ψ -Value (W/mK)
SteelLintel - E1		0.500
OtherLintels - E2		0.230
Sill - E3		0.016
Jamb - E4		0.016
GroundFloorNormal - E5		0.033
PartyFloor - E7		0.070
BalconyBetweenDwellings - E9		0.020
EavesAtCeiling - E10		0.035
EavesAtRafter - E11		0.038
GableAtCeiling - E12		0.100
GableAtRafter - E13		0.080
FlatRoof - E14		0.080
FlatRoofWithParapet - E15		0.560
CornerNormal - E16		0.035
CornerInverted - E17		-0.060
PartyWall - E18		0.060
GroundFloorInverted - E19		0.070
ExposedFloorNormal - E20		0.320
ExposedFloorInverted - E21		0.320
BasementFloor - E22		0.070
BalconyBetweenDwellingsPenetrates - E23		1.000
EavesAtCeilingInverted - E24		0.240
StaggeredPart - E25		0.120
GroundFloorWithPartyWall - P1		0.160

Site Sign Off

I can confirm that the site has been built in accordance with the specification reference SPEC-PD-RC44678 on the previous page, where the heating, hot water and ventilation has been installed as per the plot details within this document.

Name	
Company	
Date	
Signature	

If there are any changes required to the specification or plot details, please email info@briaryenergy.co.uk so we can issue a revised document.

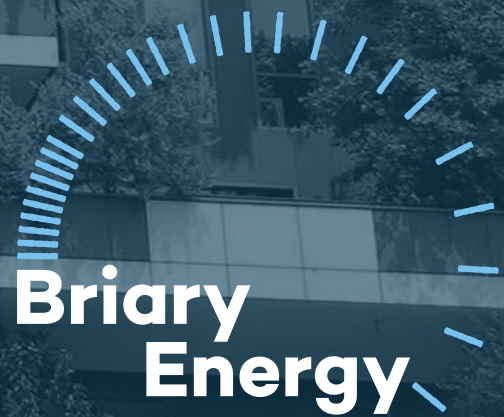
Plot Summary

The following table details the main features applied to the one plot at Rockleigh Cottage.

Plot	EPC Rating	DER/TER % Pass	DAP	WWHRS	FGHRS	PV	Weath Comp	Zoned Heating	Ventilation	Boiler Model
001 D - Rockleigh	89B	61.3%	5.01	×	×	N/A	×	Time & Temp Zone	Intermittent Fans	Grant AERONA3 HPID12R32-250l Cyl-2 loss

U-Value Calculations

Pentangle Design



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U-Value Calculation

Flr - Ground

No. of Layers	3	Internal Temperature (°C)	15	External Temperature (°C)	5
Internal Humidity	95%	External Humidity	95%		
Element Type	Floor	Total Thickness (mm)	375.00		

U-Value (W/m²K)

U_v

0.10

Heat Capacity (kJ/[m²k])

H_c

75.60

Layer	Description	Thickness (mm)	Conductivity (W/mK)	Resistance (mK/W)	Fraction %
External Surface					
Layer 1	Concrete, medium density <i>*Bridged Layer</i>	150	1.350	0.111	86%
Layer 2	Kingspan Kooltherm K103	150	0.018	8.333	100%
Layer 3	Screed	75	1.150	0.065	100%
Internal Surface					

U-Value Calculation

W1 - Block

No. of Layers	7	Internal Temperature (°C)	15	External Temperature (°C)	5
Internal Humidity	95%	External Humidity	95%		
Element Type	Wall	Total Thickness (mm)	355.50		

U-Value (W/m²K)

U_v

0.14

Heat Capacity (kJ/[m²k])

H_c

69.72

Layer	Description	Thickness (mm)	Conductivity (W/mK)	Resistance (mK/W)	Fraction %
External Surface					
Layer 1	Stranlite 4.2N <i>*Bridged Layer</i>	100	0.410	0.244	93%
Layer 2	Standard cavity	10	0.067	0.150	100%
Layer 3	Kingspan K107	115	0.018	6.389	100%
Layer 4	Stranlite 4.2N <i>*Bridged Layer</i>	100	0.410	0.244	93%
Layer 5	airspace/plaster dabs <i>*Bridged Layer</i>	15	0.088	0.170	80%
Layer 6	Plasterboard	12.5	0.210	0.060	100%
Layer 7	Plaster Skim	3	0.180	0.017	100%
Internal Surface					

Data extracted from Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.12r02

U-Value Calculation

W1 - Garage

No. of Layers	7	External Temperature (°C)	5
Internal Temperature (°C)	15	External Humidity	95%
Internal Humidity	95%	Total Thickness (mm)	355.50
Element Type	Wall		

U-Value (W/m²K)

U_v

0.14

Heat Capacity (kJ/[m²k])

H_c

69.72

Layer	Description	Thickness (mm)	Conductivity (W/mK)	Resistance (mK/W)	Fraction %
External Surface					
Layer 1	Stranlite 4.2N <i>*Bridged Layer</i>	100	0.410	0.244	93%
Layer 2	Standard cavity	10	0.067	0.150	100%
Layer 3	Kingspan K106	115	0.018	6.389	100%
Layer 4	Stranlite 4.2N <i>*Bridged Layer</i>	100	0.410	0.244	93%
Layer 5	airspace/plaster dabs <i>*Bridged Layer</i>	15	0.088	0.170	80%
Layer 6	Plasterboard	12.5	0.210	0.060	100%
Layer 7	Plaster Skim	3	0.180	0.017	100%
Internal Surface					

Data extracted from Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.12r02

U-Value Calculation

W1 - Dormer

No. of Layers	6	External Temperature (°C)	5
Internal Temperature (°C)	15	External Humidity	95%
Internal Humidity	95%	Total Thickness (mm)	198.50
Element Type	Wall		

U-Value (W/m²K)

U_v

0.18

Heat Capacity (kJ/[m²k])

H_c

7.62

Layer	Description	Thickness (mm)	Conductivity (W/mK)	Resistance (mK/W)	Fraction %
External Surface					
Layer 1	Plywood	18	0.130	0.138	100%
Layer 2	Celotex XR4000 <i>*Bridged Layer</i>	120	0.022	5.455	88%
Layer 3	Celotex TB4000 <i>*Bridged Layer</i>	25	0.022	1.136	88%
Layer 4	Low Emissivity Cavity <i>*Bridged Layer</i>	20	0.030	0.665	88%
Layer 5	Plasterboard	12.5	0.210	0.060	100%
Layer 6	Plaster Skim	3	0.180	0.017	100%
Internal Surface					

U-Value Calculation

W1 - Dormer Below Roof

No. of Layers	6	External Temperature (°C)	5
Internal Temperature (°C)	15	External Humidity	95%
Internal Humidity	95%	Total Thickness (mm)	198.50
Element Type	Wall		

U-Value (W/m²K)

U_v

0.18

Heat Capacity (kJ/[m²k])

H_c

7.62

Layer	Description	Thickness (mm)	Conductivity (W/mK)	Resistance (mK/W)	Fraction %
External Surface					
Layer 1	Plywood	18	0.130	0.138	100%
Layer 2	Celotex XR4000 <i>*Bridged Layer</i>	120	0.022	5.455	88%
Layer 3	Celotex TB4000 <i>*Bridged Layer</i>	25	0.022	1.136	88%
Layer 4	Low emissivity cavity <i>*Bridged Layer</i>	20	0.030	0.665	88%
Layer 5	Plasterboard	12.5	0.210	0.060	100%
Layer 6	Plaster Skim	3	0.180	0.017	100%
Internal Surface					

U-Value Calculation

W1 - Render

No. of Layers	8	Internal Temperature (°C)	15	External Temperature (°C)	5
Internal Humidity	95%	External Humidity	95%		
Element Type	Wall	Total Thickness (mm)	375.50		

U-Value (W/m²K)

U_v

0.14

Heat Capacity (kJ/[m²k])

H_c

69.72

Layer	Description	Thickness (mm)	Conductivity (W/mK)	Resistance (mK/W)	Fraction %
External Surface					
Layer 1	Render - Cement and Sand	20	1.000	0.020	100%
Layer 2	Stranlite 4.2N <i>*Bridged Layer</i>	100	0.410	0.244	93%
Layer 3	Standard cavity	10	0.067	0.150	100%
Layer 4	Kingspan K106	115	0.018	6.389	100%
Layer 5	Stranlite 4.2N <i>*Bridged Layer</i>	100	0.410	0.244	93%
Layer 6	airspace/plaster dabs <i>*Bridged Layer</i>	15	0.088	0.170	80%
Layer 7	Plasterboard	12.5	0.210	0.060	100%
Layer 8	Plaster Skim	3	0.180	0.017	100%
Internal Surface					

Data extracted from Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.12r02

U-Value Calculation

Rf - Behind Stud

No. of Layers	4	Internal Temperature (°C)	15	External Temperature (°C)	5
Internal Humidity	95%	External Humidity	95%		
Element Type	Roof	Total Thickness (mm)	415.50		

U-Value (W/m²K)

U_v

0.13

Heat Capacity (kJ/[m²k])

H_c

7.62

Layer	Description	Thickness (mm)	Conductivity (W/mK)	Resistance (mK/W)	Fraction %
External Surface					
Layer 1	Mineral wool	150	0.044	3.409	100%
Layer 2	Mineral wool <i>*Bridged Layer</i>	250	0.044	5.682	84%
Layer 3	Plasterboard	12.5	0.210	0.060	100%
Layer 4	Plaster Skim	3	0.180	0.017	100%
Internal Surface					

U-Value Calculation

Rf - Balcony

No. of Layers	4	External Temperature (°C)	5
Internal Temperature (°C)	15	External Humidity	95%
Internal Humidity	95%	Total Thickness (mm)	283.50
Element Type	Roof		

U-Value (W/m²K)

U_v

0.22

Heat Capacity (kJ/[m²k])

H_c

7.62

Layer	Description	Thickness (mm)	Conductivity (W/mK)	Resistance (mK/W)	Fraction %
External Surface					
Layer 1	Plywood	18	0.130	0.138	100%
Layer 2	Mineral wool <i>*Bridged Layer</i>	250	0.044	5.682	84%
Layer 3	Plasterboard	12.5	0.210	0.060	100%
Layer 4	Plaster Skim	3	0.180	0.017	100%
Internal Surface					

U-Value Calculation

Rf - Flat Roof Dormer

No. of Layers	4	External Temperature (°C)	5
Internal Temperature (°C)	15	External Humidity	95%
Internal Humidity	95%	Total Thickness (mm)	188.50
Element Type	Roof		

U-Value (W/m²K)

U_v

0.15

Heat Capacity (kJ/[m²k])

H_c

1.80

Layer	Description	Thickness (mm)	Conductivity (W/mK)	Resistance (mK/W)	Fraction %
External Surface					
Layer 1	Plywood	18	0.130	0.138	100%
Layer 2	Kooltherm K107 <i>*Bridged Layer</i>	125	0.018	6.944	92%
Layer 3	Kooltherm K18 Insulated Plasterboard (42.5mm)	42.5	0.029	1.450	100%
Layer 4	Plaster Skim	3	0.180	0.017	100%
Internal Surface					

U-Value Calculation

Rf - Ins Rafter

No. of Layers	3	Internal Temperature (°C)	15	External Temperature (°C)	5
Internal Humidity	95%	External Humidity	95%		
Element Type	Roof	Total Thickness (mm)	155.50		

U-Value (W/m²K)

U_v

0.17

Heat Capacity (kJ/[m²k])

H_c

1.80

Layer	Description	Thickness (mm)	Conductivity (W/mK)	Resistance (mK/W)	Fraction %
External Surface					
Layer 1	Kooltherm K107 Pitched roof board (100mm) <i>*Bridged Layer</i>	100	0.018	5.556	88%
Layer 2	Kooltherm K18 Insulated Plasterboard (52.5mm)	52.5	0.027	1.950	100%
Layer 3	Plaster Skim	3	0.180	0.017	100%
Internal Surface					

Data extracted from Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.12r02

U-Value Calculation

Rf - Ins Joist

No. of Layers	5	External Temperature (°C)	5
Internal Temperature (°C)	15	External Humidity	95%
Internal Humidity	95%	Total Thickness (mm)	415.50
Element Type	Roof		

U-Value (W/m²K)

U_v

0.11

Heat Capacity (kJ/[m²k])

H_c

7.62

Layer	Description	Thickness (mm)	Conductivity (W/mK)	Resistance (mK/W)	Fraction %
External Surface					
Layer 1	Mineral wool	150	0.044	3.409	100%
Layer 2	Mineral wool	150	0.044	3.409	100%
Layer 3	Mineral wool <i>*Bridged Layer</i>	100	0.044	2.273	88%
Layer 4	Plasterboard	12.5	0.210	0.060	100%
Layer 5	Plaster Skim	3	0.180	0.017	100%
Internal Surface					

Air Tightness Testing Notes

Pentangle Design



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Air Testing Notes

The test to be largely completed for the test, with the envelope sealed as required to create the air-barrier. Carpets or other floor coverings do not have to be in place. The fan equipment requires 240v electrical supply, so the sockets ideally need to be live in the plots to be tested. ready for the air test? To ensure compliance with the building regulations certain conditions should be in place prior to the engineer attending site. Examples are below, but attached is a comprehensive check list identifying areas to be permanently sealed.

- The building envelope should be in a finished state (ready to be occupied), i.e. doors, windows (any cladding if applicable) should be fitted
- Any boxed in elements are sealed i.e. waste pipe/soil pipe/duct work for MVHR systems
- Door and window thresholds and frames are sealed
- Light fittings fitted and down lighters sealed
- Sockets and Light switches fitted
- Access panels and loft hatches fitted
- Bath panels fitted and sealed
- Plumbing fittings permanently sealed
- Skirting boards fitted and sealed

Examples of the Common Areas of Leakage

- Around boiler flues
- Through and around doors - particularly double doors
- Around loft hatches
- Around water and heating pipes that penetrate into hollow floor voids and partition walls
- Cracks or holes through a masonry inner leaf
- Around supplies from external meter boxes
- Gaps around pipes to cold water and/or heating header tanks
- Between and around sections of suspended floors
- Beneath doors and doorframes
- Through windows and/or hollow window frames
- Roof Lights
- Around and through wall-mounted extract fans, cooker hood vents, tumble dryer vents
- Around waste pipes, gas and water supplies, cables, which penetrate the lower floor and through walls
- Along the top and bottom edges of skirting boards
- Beneath inner window sills and around window frames
- Through gaps behind plasterboard on dabs or hollow studwork walls
- Around waste pipes passing into floor voids or boxed in soil stacks
- Around wall mounted fan or radiant heaters; around and through fused spurs and pull switches
- Around and through recessed spotlights
- Hole around the top of a soil stack



Air Testing Plot Checklist

It is recommended that the building fabric has a suitably robust air barrier installed. In the event that the final finishes are used as the air barrier this is a simple check list which simplifies what needs to be sealed prior to the air testing. In some cases you may not be able to seal all items listed.

Item No	Item Description	Tradesperson Responsible	Tick Once Complete
1	SEAL ALL SKIRTING BOARDS	1	
2	SEAL SKIRTING BOARDS UNDER THE KITCHEN UNITS, OR SEAL PLASTERBOARD TO FLOOR	1 6	
3	SILICONE SEAL KITCHEN WASTE PIPES	2 3	
4	SEAL KITCHEN BOILER PIPES AND FLUE PIPES	5	
5	ONCE THE FAN KITCHEN EXTRACT IS INSTALLED IT NEEDS A TIGHT SEAL	3 4 6	
6	INSTALL ALL KITCHEN LIGHTS AND LIGHT/ SOCKET FACE PLATES	4	
7	SEAL AROUND GROUND FLOOR TOILET WASTE PIPES AND WATER PIPES	2	
8	SEAL AROUND ALL BOXING IN THE GROUND FLOOR TOILET	1	
9	ALL WINDOWS NEED TO BE SEALED AND WINDOW SILL BOARDS NEED A SILICONE SEAL	1	
10	RADIATOR - SEAL AROUND THE BACK OF THE PUSH-FIT CAPS AND FLEX PIPES	5	
11	DOOR THRESHOLD NEEDS TO BE SEALED	1	
12	DOOR RUBBER DRAUGHT EXCLUDER NEEDS TO BE INSTALLED	1	
13	ANY FLOOR PENETRATIONS FOR ELECTRICAL CABLES NEED TO BE SEALED WITH SILICONE	4	
14	UPSTAIRS BATHROOM PIPEWORK UNDER BATH NEEDS TO BE SEALED	2	
15	UNDER BATH - PLASTERBOARD NEEDS SEALING TO FLOOR	2 6	
16	WASTE PIPE BOXING IN UPSTAIRS BATHROOM THAT GOES TO THE LOFT/ EXTERNAL- SEAL	1	
17	BATHROOM EXTRACT NEEDS SEALING TO THE WALL	4	
18	BATH PANEL NEEDS FITTING AND SEALING	2	
19	ANY MDF BOXING IN UPSTAIRS BATHROOM IS TO BE SEALED WITH SILICONE	1	
20	LOFT HATCH NEEDS TO BE INSTALLED	1	
21	LOFT HATCH NEEDS TO BE SEALED WITH CAULK AROUND THE FRAME	1	
22	NO LARGE HOLES OR VOIDS CUT IN PLASTERBOARD ARE TO BE LEFT UNSEALED	2 4 6	
23	NO LARGE VOIDS BEHIND RADIATORS IF PLASTIC CAPS ARE NOT INSTALLED- SEAL	5	

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