

PREDICTED ENERGY ASSESSMENT



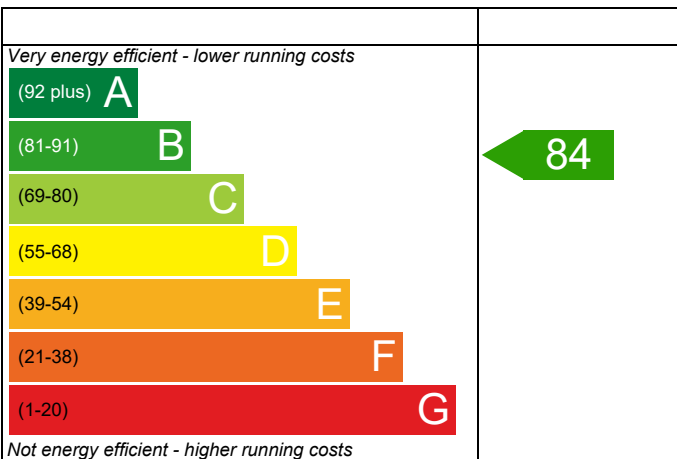
Plot 670

Dwelling type: Flat, Detached
 Date of assessment: 26/02/2021
 Produced by: Michael Juckes
 Total floor area: 67.16 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.

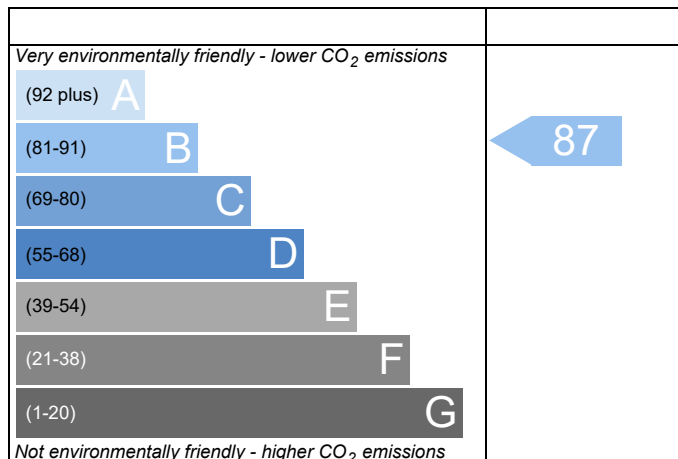
Energy Efficiency Rating



England 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



England 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.

BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)



Property Reference	670 - PRJ009149		Issued on Date	26/02/2021	
Assessment Reference	670	Prop Type Ref	Block B		
Property	Plot 670				
SAP Rating	84 B	DER	17.54	TER	18.43
Environmental	87 B	% DER<TER	4.81		
CO ₂ Emissions (t/year)	0.96	DFEE	44.85	TFEE	48.96
General Requirements Compliance	Pass	% DFEE<TFEE	8.40		
Assessor Details	Mr. Michael Juckes, Michael Juckes, Tel: 02033971373, michael@briaryenergy.co.uk			Assessor ID	T850-0001
Client					

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	18.43	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	17.54	kgCO ₂ /m ²	Pass
	-0.89 (-4.8%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	48.96	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	44.85	kWh/m ² /yr	
	-4.2 (-8.6%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.26 (max. 0.30)	0.26 (max. 0.70)	Pass
Openings	1.38 (max. 2.00)	1.40 (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	5.01 (design value)	m ³ /(h.m ²) @ 50 Pa	
Maximum	10.0	m ³ /(h.m ²) @ 50 Pa	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Boiler system with radiators or underfloor - Mains gas Data from database Ideal LOGIC COMBI ESP1 30 Combi boiler Efficiency: 89.6% SEDBUK2009 Minimum: 88.0%	Pass
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BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)



Secondary heating system

None

5 Cylinder insulation

Hot water storage

No cylinder

6 Controls

Space heating controls

Programmer, room thermostat and TRVs

Pass

Hot water controls

No cylinder

Boiler interlock

Yes

Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100

%

Minimum

75

%

Pass

8 Mechanical ventilation

Continuous extract system (decentralised)

Specific fan power

0.1900 0.1800

Maximum

0.7

Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Southern England)

Slight

Pass

Based on:

Overshading

Average

Windows facing North East

4.85 m², No overhang

Windows facing South West

5.61 m², No overhang

Windows facing North West

5.50 m², No overhang

Air change rate

4.55 ach

Blinds/curtains

Dark-coloured curtain or roller blind, closed 100% of daylight hours

Criterion 4 – Building performance consistent with DER and DFEE rate

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.01 (design value)

m³/(h.m²) @ 50 Pa

Maximum

10.0

m³/(h.m²) @ 50 Pa

Pass

10 Key features

None

N/A

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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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General Requirements Compliance	Pass	% DFEE<TFEE	8.40		

Assessor Details	Mr. Michael Juckes, Michael Juckes, Tel: 02033971373, michael@briaryenergy.co.uk	Assessor ID	T850-0001
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Client	
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CALCULATION OF HEAT DEMAND 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
 CALCULATION OF HEAT DEMAND 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	67.1600 (1b)	x 2.4600 (2b)	= 165.2136 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	67.1600		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 165.2136 (5)
Dwelling volume			

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour							
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)							
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)							
Number of intermittent fans				0 * 10 =	0.0000 (7a)							
Number of passive vents				0 * 10 =	0.0000 (7b)							
Number of flueless gas fires				0 * 40 =	0.0000 (7c)							
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				0.0000 / (5) =	0.0000 (8)							
Pressure test				Yes								
Measured/design AP50				5.0100								
Infiltration rate				0.2505	0.2505 (18)							
Number of sides sheltered				0	0 (19)							
Shelter factor			(20) = 1 - [0.075 x (19)] =		1.0000 (20)							
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2505 (21)							
Wind speed	Jan 5.1000	Feb 4.7000	Mar 4.6000	Apr 4.3000	May 4.3000	Jun 4.0000	Jul 4.0000	Aug 3.9000	Sep 4.0000	Oct 4.5000	Nov 4.4000	Dec 4.7000 (22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750 (22a)
Adj infilt rate	0.3194	0.2943	0.2881	0.2693	0.2693	0.2505	0.2505	0.2442	0.2505	0.2818	0.2756	0.2943 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5694	0.5443	0.5381	0.5193	0.5193	0.5005	0.5005	0.5000	0.5005	0.5318	0.5256	0.5443 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Windows (Uw = 1.40)			15.9600	1.3258	21.1591		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
W1 - Brick	64.7110	15.9640	48.7470	0.2600	12.6742	58.7400	2863.3988 (29a)
W1 - To Corridor	27.3800	2.1170	25.2630	0.2499	6.3135	106.6200	2693.5411 (29a)
Total net area of external elements Aum, (m ²)			92.0900				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	42.6908		(33)
Party Floor			67.1550			40.0000	2686.2000 (32d)
Party Ceiling			67.1550			70.0000	4700.8500 (32b)
1st Floor Stud			129.5141			5.8200	753.7719 (32c)
Heat capacity Cm = Sum (A x k)						(28)...(30) + (32) + (32a)...(32e) =	13697.7618 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							203.9571 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.0858 (36)
Total fabric heat loss						(33) + (36) =	49.7766 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

Living area fraction										fLA = Living area / (4) =	0.2799 (91)	
MIT	19.2954	19.4813	19.7848	20.0776	20.2067	20.2490	20.2522	20.2523	20.2381	20.0666	19.6997	19.2838 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.1454	19.3313	19.6348	19.9276	20.0567	20.0990	20.1022	20.1023	20.0881	19.9166	19.5497	19.1338 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9515	0.9261	0.8567	0.7107	0.5188	0.3164	0.2025	0.2206	0.4452	0.7530	0.9084	0.9594 (94)
Useful gains	619.7208	683.6007	733.6647	715.5860	562.2767	360.3091	215.7704	215.6215	384.7889	547.7520	587.8862	581.7168 (95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000 (96)
Heat loss rate W												
Month fracti	1110.9015	1083.0652	975.8396	806.4623	582.2810	362.1222	215.9527	215.8790	392.1072	639.3568	874.4707	1083.2653 (97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000 (97a)
Space heating	365.4385	268.4401	180.1782	65.4309	14.8832	0.0000	0.0000	0.0000	0.0000	68.1539	206.3409	373.1521 (98)
RHI space heating demand												1542.0177 (98)
												1542 (98)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
 CALCULATION OF ENERGY RATINGS 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	67.1600 (1b)	x 2.4600 (2b)	= 165.2136 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	67.1600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 165.2136 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)
Number of intermittent fans				0 * 10 =	0.0000 (7a)
Number of passive vents				0 * 10 =	0.0000 (7b)
Number of flueless gas fires				0 * 40 =	0.0000 (7c)
Air changes per hour					
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				0.0000 / (5) =	0.0000 (8)
Pressure test				Yes	
Measured/design AP50				5.0100	
Infiltration rate				0.2505	(18)
Number of sides sheltered				0	(19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		1.0000 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2505 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.3194	0.3131	0.3069	0.2756	0.2693	0.2380	0.2380	0.2317	0.2505	0.2693	0.2818	0.2943 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5694	0.5631	0.5569	0.5256	0.5193	0.5000	0.5000	0.5000	0.5005	0.5193	0.5318	0.5443 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Windows (Uw = 1.40)			15.9600	1.3258	21.1591		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Brick	64.7110	15.9640	48.7470	0.2600	12.6742	58.7400	2863.3988 (29a)
Wl - To Corridor	27.3800	2.1170	25.2630	0.2499	6.3135	106.6200	2693.5411 (29a)
Total net area of external elements Aum(A, m ²)			92.0900				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	42.6908			(33)
Party Floor			67.1550			40.0000	2686.2000 (32d)
Party Ceiling			67.1550			70.0000	4700.8500 (32b)
1st Floor Stud			129.5141			5.8200	753.7719 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 13697.7618 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							203.9571 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.0858 (36)
Total fabric heat loss							(33) + (36) = 49.7766 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	31.0433	30.7018	30.3604	28.6532	28.3118	27.2602	27.2602	27.2602	27.2875	28.3118	28.9947	29.6775 (38)
Average = Sum(39)m / 12 =	80.8199	80.4784	80.1370	78.4298	78.0884	77.0368	77.0368	77.0368	77.0641	78.0884	78.7713	79.4541 (39)
												78.5368 (39)

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.2034	1.1983	1.1932	1.1678	1.1627	1.1471	1.1471	1.1471	1.1475	1.1627	1.1729	1.1831 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.1753 (42)
Average daily hot water use (litres/day)												85.8622 (43)
Daily hot water use	94.4485	91.0140	87.5795	84.1450	80.7105	77.2760	77.2760	80.7105	84.1450	87.5795	91.0140	94.4485 (44)
Energy conte	140.0643	122.5012	126.4102	110.2075	105.7467	91.2514	84.5578	97.0313	98.1902	114.4312	124.9106	135.6448 (45)
Energy content (annual)												Total = Sum(45)m = 1350.9473 (45)
Distribution loss (46)m = 0.15 x (45)m												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

Water storage loss:	21.0096	18.3752	18.9615	16.5311	15.8620	13.6877	12.6837	14.5547	14.7285	17.1647	18.7366	20.3467 (46)
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	14.6138	13.1756	14.5490	14.0365	14.4730	13.9698	14.4129	14.4519	14.0062	14.5176	14.0994	14.6013 (61)
Total heat required for water heating calculated for each month	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461 (62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461 (64)
Heat gains from water heating, kWh/month	50.2248	44.0255	45.6687	40.1531	38.7790	33.8335	31.7187	35.8759	36.1498	41.6778	45.0576	48.7522 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	42.4759	37.7267	30.6814	23.2278	17.3631	14.6586	15.8392	20.5883	27.6336	35.0872	40.9520	43.6564 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	284.4478	287.3995	279.9614	264.1265	244.1378	225.3512	212.8006	209.8489	217.2870	233.1219	253.1107	271.8973 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101 (71)
Water heating gains (Table 5)	67.5065	65.5142	61.3826	55.7682	52.1223	46.9910	42.6327	48.2203	50.2080	56.0185	62.5800	65.5272 (72)
Total internal gains	491.1620	487.3722	468.7572	439.8543	410.3550	383.7326	368.0042	375.3893	391.8605	420.9595	453.3745	477.8126 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data g or Table 6b	Specific data FF or Table 6c	Access factor Table 6d	Gains W						
Northeast	4.8500	11.2829	0.5000	0.0000	0.7700	21.0681 (75)						
Southwest	5.6100	36.7938	0.5000	0.0000	0.7700	79.4692 (79)						
Northwest	5.5040	11.2829	0.5000	0.0000	0.7700	23.9090 (81)						
Solar gains	124.4462	226.9175	350.1607	500.3794	621.1769	643.3894	609.1828	514.9798	401.5378	261.4916	151.7785	104.7396 (83)
Total gains	615.6083	714.2897	818.9179	940.2337	1031.5319	1027.1220	977.1870	890.3691	793.3983	682.4510	605.1530	582.5522 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)	21.0000 (85)											
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	47.0792	47.2789	47.4804	48.5139	48.7260	49.3911	49.3911	49.3911	49.3736	48.7260	48.3036	47.8884
alpha	4.1386	4.1519	4.1654	4.2343	4.2484	4.2927	4.2927	4.2927	4.2916	4.2484	4.2202	4.1926
util living area	0.9785	0.9603	0.9178	0.8127	0.6483	0.4691	0.3445	0.3934	0.6251	0.8726	0.9616	0.9823 (86)
MIT	19.7906	20.0122	20.3344	20.6985	20.9061	20.9816	20.9961	20.9933	20.9414	20.6465	20.1645	19.7606 (87)
Th 2	19.9173	19.9214	19.9254	19.9458	19.9499	19.9626	19.9626	19.9626	19.9623	19.9499	19.9417	19.9336 (88)
util rest of house	0.9731	0.9507	0.8986	0.7745	0.5899	0.3973	0.2644	0.3069	0.5464	0.8358	0.9507	0.9778 (89)
MIT 2	18.8441	19.0630	19.3740	19.7206	19.8916	19.9544	19.9615	19.9606	19.9323	19.6892	19.2312	18.8277 (90)
Living area fraction	19.1091	19.3287	19.6429	19.9943	20.1756	20.2420	20.2512	20.2497	20.2148	19.9571	19.4925	19.0888 (92)
Temperature adjustment	18.9591	19.1787	19.4929	19.8443	20.0256	20.0920	20.1012	20.0997	20.0648	19.8071	19.3425	-0.1500
adjusted MIT												18.9388 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9669	0.9425	0.8895	0.7704	0.5943	0.4065	0.2752	0.3185	0.5546	0.8299	0.9429	0.9724 (94)
Ext temp.	595.2147	673.2036	728.4559	724.3660	613.0199	417.5074	268.9392	283.5491	439.9949	566.4002	570.5726	566.4511 (95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Month fracti	1184.7460	1149.1289	1041.2106	858.3632	650.1305	423.0832	269.7176	285.0102	459.6707	718.9710	964.3533	1171.0622 (97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000 (97a)
Space heating per m2	438.6112	319.8218	232.6895	96.4780	27.6103	0.0000	0.0000	0.0000	0.0000	113.5127	283.5221	449.8307 (98)
												1962.0763 (98)
												29.2150 (99)

8c. Space cooling requirement

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

Not applicable

9a. Energy requirements - Individual heating systems, including micro-CHP

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													90.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													2168.0401 (211)
Space heating requirement	438.6112	319.8218	232.6895	96.4780	27.6103	0.0000	0.0000	0.0000	0.0000	113.5127	283.5221	449.8307	(98)
Space heating efficiency (main heating system 1)	90.5000	90.5000	90.5000	90.5000	90.5000	0.0000	0.0000	0.0000	0.0000	90.5000	90.5000	90.5000	(210)
Space heating fuel (main heating system)	484.6533	353.3942	257.1155	106.6055	30.5086	0.0000	0.0000	0.0000	0.0000	125.4284	313.2841	497.0505	(211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating requirement	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461	(64)
Efficiency of water heater (217)m	89.6433	89.5226	89.2656	88.6704	87.8804	87.3000	87.3000	87.3000	87.3000	88.7695	89.4216	89.6770	(216)
Fuel for water heating, kWh/month	172.5484	151.5559	157.9099	140.1188	136.7992	120.5283	113.3686	127.7012	128.5182	145.2625	155.4545	167.5414	(219)
Water heating fuel used													1717.3069 (219)
Annual totals kWh/year													
Space heating fuel - main system													2168.0401 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans: (MEVDecentralised, Database: total watage = 5.0830, total flow = 21.0000, SFP = 0.2420)													
mechanical ventilation fans (SFP = 0.2420)													48.7873 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													123.7873 (231)
Electricity for lighting (calculated in Appendix L)													300.0549 (232)
Total delivered energy for all uses													4309.1892 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2168.0401	3.4800	75.4478	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1717.3069	3.4800	59.7623	(247)
Mechanical ventilation fans	48.7873	13.1900	6.4350	(249)
Pumps and fans for heating	75.0000	13.1900	9.8925	(249)
Energy for lighting	300.0549	13.1900	39.5772	(250)
Additional standing charges			120.0000	(251)
Total energy cost			311.1149	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.1650 (257)
SAP value		83.7480
SAP rating (Section 12)		84 (258)
SAP band		B

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2168.0401	0.2160	468.2967	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1717.3069	0.2160	370.9383	(264)
Space and water heating			839.2350	(265)
Pumps and fans	123.7873	0.5190	64.2456	(267)
Energy for lighting	300.0549	0.5190	155.7285	(268)
Total kg/year			1059.2091	(272)
CO2 emissions per m2			15.7700	(273)
EI value			87.3454	
EI rating			87	(274)
EI band			B	

Calculation of stars for heating and DHW

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.9050 = 3.845$, stars = 4
Main heating environmental impact	$0.216 \times (1 + 0.29 \times 0.00) / 0.9050 = 0.2387$, stars = 4
Water heating energy efficiency	$3.48 / 0.8850 = 3.932$, stars = 4
Water heating environmental impact	$0.216 / 0.8850 = 0.2441$, stars = 4

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
 CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	67.1600 (1b)	x 2.4600 (2b)	= 165.2136 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	67.1600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 165.2136 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)
Number of intermittent fans				0 * 10 =	0.0000 (7a)
Number of passive vents				0 * 10 =	0.0000 (7b)
Number of flueless gas fires				0 * 40 =	0.0000 (7c)
Air changes per hour					
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				0.0000 / (5) =	0.0000 (8)
Pressure test				Yes	
Measured/design AP50					5.0100
Infiltration rate					0.2505 (18)
Number of sides sheltered					0 (19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		1.0000 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2505 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000 (22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750 (22a)
Adj infilt rate	0.3194	0.2943	0.2881	0.2693	0.2693	0.2505	0.2505	0.2442	0.2505	0.2818	0.2756	0.2943 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5694	0.5443	0.5381	0.5193	0.5193	0.5005	0.5005	0.5000	0.5005	0.5318	0.5256	0.5443 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Windows (Uw = 1.40)			15.9600	1.3258	21.1591		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Brick	64.7110	15.9640	48.7470	0.2600	12.6742	58.7400	2863.3988 (29a)
Wl - To Corridor	27.3800	2.1170	25.2630	0.2499	6.3135	106.6200	2693.5411 (29a)
Total net area of external elements Aum(A, m ²)			92.0900				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	42.6908			(33)
Party Floor			67.1550			40.0000	2686.2000 (32d)
Party Ceiling			67.1550			70.0000	4700.8500 (32b)
1st Floor Stud			129.5141			5.8200	753.7719 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 13697.7618 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							203.9571 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.0858 (36)
Total fabric heat loss							(33) + (36) = 49.7766 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	31.0433	29.6775	29.3361	28.3118	28.3118	27.2875	27.2875	27.2602	27.2875	28.9947	28.6532	29.6775 (38)
Average = Sum(39)m / 12 =	80.8199	79.4541	79.1127	78.0884	78.0884	77.0641	77.0641	77.0368	77.0641	78.7713	78.4298	79.4541 (39)
HLP	1.2034	1.1831	1.1780	1.1627	1.1627	1.1475	1.1475	1.1471	1.1475	1.1729	1.1678	1.1831 (40)
HLP (average)												1.1669 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.1753 (42)
Average daily hot water use (litres/day)												85.8622 (43)
Daily hot water use	94.4485	91.0140	87.5795	84.1450	80.7105	77.2760	77.2760	80.7105	84.1450	87.5795	91.0140	94.4485 (44)
Energy conte	140.0643	122.5012	126.4102	110.2075	105.7467	91.2514	84.5578	97.0313	98.1902	114.4312	124.9106	135.6448 (45)
Energy content (annual)												Total = Sum(45)m = 1350.9473 (45)
Distribution loss (46)m = 0.15 x (45)m												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

Not applicable

9a. Energy requirements - Individual heating systems, including micro-CHP

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													90.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													1703.8870 (211)
Space heating requirement	365.4385	268.4401	180.1782	65.4309	14.8832	0.0000	0.0000	0.0000	0.0000	68.1539	206.3409	373.1521	(98)
Space heating efficiency (main heating system 1)	90.5000	90.5000	90.5000	90.5000	90.5000	0.0000	0.0000	0.0000	0.0000	90.5000	90.5000	90.5000	(210)
Space heating fuel (main heating system)	403.7994	296.6189	199.0919	72.2994	16.4455	0.0000	0.0000	0.0000	0.0000	75.3082	228.0009	412.3227	(211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating requirement	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461	(64)
Efficiency of water heater (217)m	89.5241	89.3998	89.0670	88.3780	87.6414	87.3000	87.3000	87.3000	87.3000	88.3806	89.1841	89.5577	(216)
Fuel for water heating, kWh/month	172.7782	151.7640	158.2621	140.5825	137.1723	120.5283	113.3686	127.7012	128.5182	145.9017	155.8685	167.7646	(219)
Water heating fuel used													1720.2101 (219)
Annual totals kWh/year													
Space heating fuel - main system													1703.8870 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans: (MEVDecentralised, Database: total watage = 5.0830, total flow = 21.0000, SFP = 0.2420)													
mechanical ventilation fans (SFP = 0.2420)													48.7873 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													123.7873 (231)
Electricity for lighting (calculated in Appendix L)													300.0549 (232)
Total delivered energy for all uses													3847.9393 (238)

10a. Fuel costs - using BEDF prices (472)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1703.8870	3.8700	65.9404 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1720.2101	3.8700	66.5721 (247)
Mechanical ventilation fans	48.7873	18.9000	9.2208 (249)
Pumps and fans for heating	75.0000	18.9000	14.1750 (249)
Energy for lighting	300.0549	18.9000	56.7104 (250)
Additional standing charges			93.0000 (251)
Total energy cost			305.6187 (255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	1703.8870	0.2160	368.0396 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1720.2101	0.2160	371.5654 (264)
Space and water heating			739.6050 (265)
Pumps and fans	123.7873	0.5190	64.2456 (267)
Energy for lighting	300.0549	0.5190	155.7285 (268)
Total kg/year			959.5791 (272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	1703.8870	1.2200	2078.7421 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1720.2101	1.2200	2098.6564 (264)
Space and water heating			4177.3985 (265)
Pumps and fans	123.7873	3.0700	380.0269 (267)
Energy for lighting	300.0549	3.0700	921.1686 (268)
Primary energy kWh/year			5478.5939 (272)
Primary energy kWh/m2/year			81.5753 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 84
 Current environmental impact rating: B 87

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

(For testing purposes):

A	Not considered
B	Not considered
C	Not considered
D	Not considered
E	Low energy lighting
F	Already installed
G	Not considered
H	Not considered
I	Not considered
J	Not considered
K	Not considered
M	Not considered
N	Solar water heating
O	Not applicable
P	Not considered
R	Not considered
S	Not considered
T	Not considered
U	Solar photovoltaic panels
A2	Not applicable
A3	Not considered
T2	Not considered
W	Not considered
X	Not considered
Y	Not considered
J2	Not considered
Q2	Not considered
Z1	Not considered
Z2	Not considered
Z3	Not considered
Z4	Not considered
Z5	Not considered
V2	Wind turbine
L2	Not applicable
Q3	Not considered
O3	Not considered

Recommended measures: (none)	SAP change	Cost change	CO2 change
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Recommended measures (none)	Typical annual savings	Energy efficiency	Environmental impact
	Total Savings £0	0.00 kg/m ²	

Potential energy efficiency rating: B 84
 Potential environmental impact rating: B 87

Fuel prices for cost data on this page from database revision number 472 TEST (30 Jan 2021)
 Recommendation texts revision number 4.9c (22 Feb 2014)

Typical heating and lighting costs of this home (per year, Southern England):

	Current	Potential	Saving
Electricity	£80	£80	£0
Mains gas	£226	£226	£0
Space heating	£182	£182	£0
Water heating	£67	£67	£0
Lighting	£57	£57	£0
Total cost of fuels	£306	£306	£0
Total cost of uses	£306	£306	£0
Delivered energy	57 kWh/m ²	57 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	1.0 tonnes	1.0 tonnes	0.0 tonnes
CO2 emissions per m ²	14 kg/m ²	14 kg/m ²	0 kg/m ²
Primary energy	82 kWh/m ²	82 kWh/m ²	0 kWh/m ²

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

No improvements selected / applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 09 Jan 2014

No improvements selected / applicable

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



Property Reference	670 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	670	Prop Type Ref	Block B
Property	Plot 670		

SAP Rating	84 B	DER	17.54	TER	18.43
Environmental	87 B	% DER<TER	4.81		
CO₂ Emissions (t/year)	0.96	DFEE	44.85	TFEE	48.96
General Requirements Compliance	Pass	% DFEE<TFEE	8.40		

Assessor Details	Mr. Michael Juckes, Michael Juckes, Tel: 02033971373, michael@briaryenergy.co.uk	Assessor ID	T850-0001
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Client	
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SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	18.43	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	17.54	kgCO ₂ /m ²	Pass
	-0.89 (-4.8%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	48.96	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	44.85	kWh/m ² /yr	
	-4.2 (-8.6%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.26 (max. 0.30)	0.26 (max. 0.70)	Pass
Openings	1.38 (max. 2.00)	1.40 (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	5.01 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Boiler system with radiators or underfloor - Mains gas Data from database Ideal LOGIC COMBI ESP1 30 Combi boiler Efficiency: 89.6% SEDBUK2009 Minimum: 88.0%	Pass
Secondary heating system	None	

5 Cylinder insulation

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



Hot water storage

No cylinder

6 Controls

Space heating controls

Programmer, room thermostat and TRVs

Pass

Hot water controls

No cylinder

Boiler interlock

Yes

Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100

%

Minimum

75

%

Pass

8 Mechanical ventilation

Continuous extract system (decentralised)

Specific fan power

0.1900 0.1800

Maximum

0.7

Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Southern England)

Slight

Pass

Based on:

Overshading

Average

Windows facing North East

4.85 m², No overhang

Windows facing South West

5.61 m², No overhang

Windows facing North West

5.50 m², No overhang

Air change rate

4.55 ach

Blinds/curtains

Dark-coloured curtain or roller blind, closed 100% of daylight hours

Criterion 4 – Building performance consistent with DER and DFEE rate

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.01 (design value)

Maximum

10.0

Pass

10 Key features

None

N/A

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