

PREDICTED ENERGY ASSESSMENT

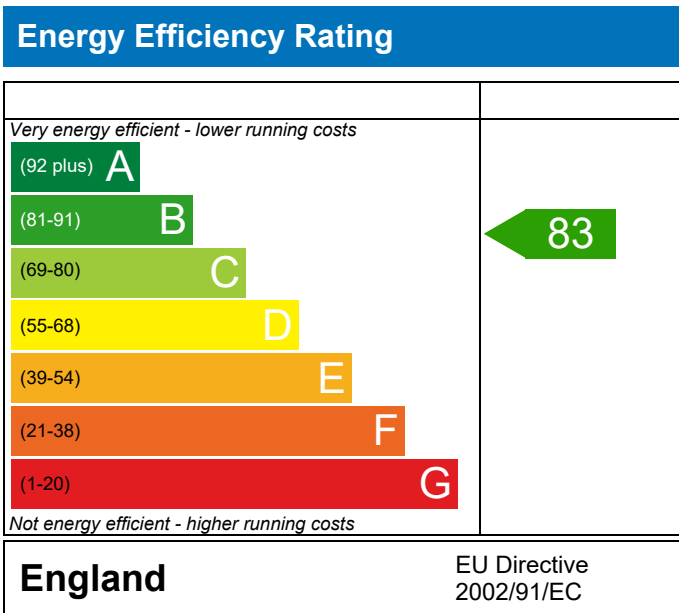


517 - PRJ009194 - GF

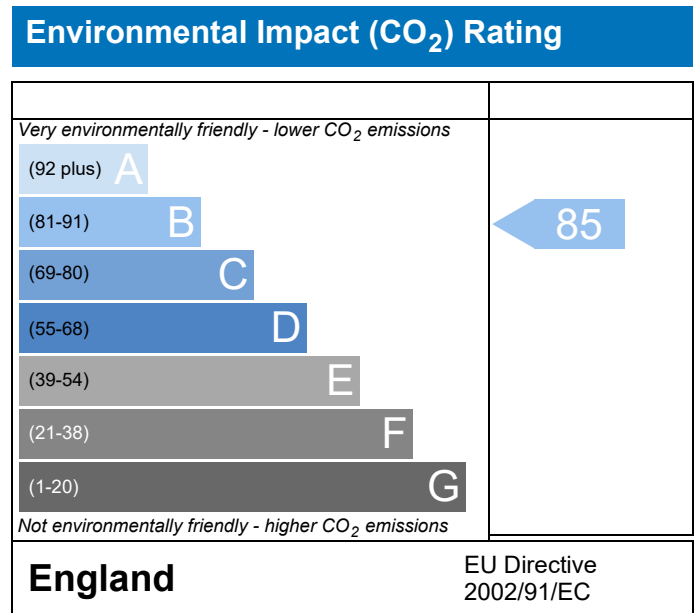
Dwelling type: Flat, End-Terrace
 Date of assessment: 26/02/2021
 Produced by: Michael Juckes
 Total floor area: 69.37 m²

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.



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.

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	517 - PRJ009194 - GF		Issued on Date	26/02/2021	
Assessment Reference	517 E	Prop Type Ref	Block B - GF		
Property	517 - PRJ009194 - GF				
SAP Rating	83 B	DER	20.04	TER	20.26
Environmental	85 B	% DER<TER	1.10		
CO ₂ Emissions (t/year)	1.12	DFEE	54.90	TFEE	57.97
General Requirements Compliance	Pass	% DFEE<TFEE	5.29		
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)	20.26	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	20.04	kgCO ₂ /m ²	Pass
	-0.22 (-1.1%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	57.97	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	54.90	kWh/m ² /yr	
	-3.1 (-5.3%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.27 (max. 0.30)	0.28 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.15 (max. 0.25)	0.15 (max. 0.70)	Pass
Openings	1.37 (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

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BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)



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

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

7.56 m², No overhang

Windows facing North West

5.04 m², No overhang

Air change rate

4.21 ach

Blinds/curtains

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

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type

U-value

Filled Cavity with Edge Sealing

0.00

W/m²K

Pass

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

Party wall U-value

0.00

W/m²K

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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	517 - PRJ009194 - GF	Issued on Date	26/02/2021
Assessment Reference	517 E	Prop Type Ref	Block B - GF
Property	517 - PRJ009194 - GF		

SAP Rating	83 B	DER	20.04	TER	20.26
Environmental	85 B	% DER<TER	1.10		
CO ₂ Emissions (t/year)	1.12	DFEE	54.90	TTEE	57.97
General Requirements Compliance	Pass	% DFEE<TTEE	5.29		

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	69.3700 (1b)	x 2.5100 (2b)	= 174.1187 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	69.3700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 174.1187 (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)
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				1	(19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.9250 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2317 (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	0.2954	0.2723	0.2665	0.2491	0.2491	0.2317	0.2317	0.2259	0.2317	0.2607	0.2549	0.2723 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5454	0.5223	0.5165	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5107	0.5049	0.5223 (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)			12.6000	1.3258	16.7045		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Flr - Ground			69.3710	0.1500	10.4057	70.5600	4894.8178 (28a)
Wl - Brick	45.7180	12.6000	33.1180	0.2800	9.2730	104.1000	3447.5838 (29a)
Wl - To Corridor	27.6100	2.1170	25.4930	0.2499	6.3710	106.6200	2718.0637 (29a)
Total net area of external elements Aum(A, m ²)			142.7020				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		45.2982		(33)
Party Wall			14.0940	0.0000	0.0000	54.0300	761.4988 (32)
Party Ceiling			69.3710			70.0000	4855.9700 (32b)
Ground Floor Stud			137.2920			5.8200	799.0393 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		17476.9734 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							251.9385 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							10.3084 (36)
Total fabric heat loss					(33) + (36) =		55.6066 (37)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

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	31.3402	30.0088	29.6759	28.7296	28.7296	28.7296	28.7296	28.7296	28.7296	29.3431	29.0102	30.0088 (38)
Average = Sum(39)m / 12 =	86.9468	85.6154	85.2825	84.3362	84.3362	84.3362	84.3362	84.3362	84.3362	84.9497	84.6168	85.6154 (39)
												84.9203 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.2534	1.2342	1.2294	1.2157	1.2157	1.2157	1.2157	1.2157	1.2157	1.2246	1.2198	1.2342 (40)
Days in month												1.2242 (40)
	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.2307 (42)
Average daily hot water use (litres/day)													87.1799 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	95.8979	92.4107	88.9235	85.4363	81.9491	78.4619	78.4619	81.9491	85.4363	88.9235	92.4107	95.8979 (44)	
Energy content (annual)	142.2138	124.3811	128.3502	111.8988	107.3695	92.6518	85.8555	98.5204	99.6971	116.1873	126.8275	137.7265 (45)	
Distribution loss (46)m = 0.15 x (45)m	21.3321	18.6572	19.2525	16.7848	16.1054	13.8978	12.8783	14.7781	14.9546	17.4281	19.0241	20.6590 (46)	
Water storage loss:													
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													
Combi loss	14.6261	13.1859	14.5593	14.0451	14.4809	13.9764	14.4190	14.4591	14.0138	14.5269	14.1099	14.6131 (61)	
Total heat required for water heating calculated for each month	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (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	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (64)	
RHI water heating demand												1543 (64)	
Heat gains from water heating, kWh/month	50.9426	44.6532	46.3163	40.7176	39.3206	34.3008	32.1517	36.3728	36.6527	42.2640	45.6976	49.4473 (65)	

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	44.5128	39.5359	32.1527	24.3417	18.1957	15.3616	16.5987	21.5756	28.9588	36.7698	42.9158	45.7499 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	292.2720	295.3049	287.6621	271.3917	250.8531	231.5498	218.6540	215.6211	223.2638	239.5343	260.0728	279.3762 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151 (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)	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293 (71)
Water heating gains (Table 5)	68.4712	66.4482	62.2530	56.5523	52.8503	47.6400	43.2146	48.8882	50.9066	56.8064	63.4689	66.4615 (72)
Total internal gains	503.4858	499.5187	480.2977	450.5154	420.1289	392.7811	376.6971	384.3147	401.3590	431.3403	464.6874	489.8174 (73)

6. Solar gains

[Jan]		Area	Solar flux	g	FF	Access	Gains					
		m ²	Table 6a	Specific data	Specific data	factor data	W					
			W/m ²	or Table 6b	or Table 6c	Table 6d						
Northeast		7.5600	15.0428	0.5000	0.0000	0.7700	43.7837 (75)					
Northwest		5.0400	15.0428	0.5000	0.0000	0.7700	29.1891 (81)					
Solar gains	72.9728	127.8097	229.9190	383.2570	489.2236	562.5735	514.4496	421.1234	296.8978	165.5672	91.1847	56.7668 (83)
Total gains	576.4586	627.3284	710.2167	833.7724	909.3525	955.3547	891.1467	805.4381	698.2568	596.9075	555.8721	546.5842 (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	55.8355	56.7038	56.9251	57.5638	57.5638	57.5638	57.5638	57.5638	57.5638	57.1481	57.3729	56.7038	
alpha	4.7224	4.7803	4.7950	4.8376	4.8376	4.8376	4.8376	4.8376	4.8376	4.8099	4.8249	4.7803	
util living area	0.9898	0.9843	0.9618	0.8820	0.7120	0.4859	0.3487	0.3850	0.6751	0.9183	0.9789	0.9915 (86)	
MIT	19.9621	20.0823	20.3563	20.6994	20.9189	20.9893	20.9983	20.9974	20.9540	20.6901	20.3063	19.9594 (87)	
Th 2	19.8775	19.8927	19.8966	19.9074	19.9074	19.9074	19.9074	19.9074	19.9074	19.9004	19.9042	19.8927 (88)	
util rest of house	0.9863	0.9790	0.9488	0.8455	0.6406	0.3951	0.2465	0.2726	0.5725	0.8810	0.9701	0.9885 (89)	
MIT 2	18.9658	19.0963	19.3654	19.6889	19.8626	19.9039	19.9072	19.9070	19.8887	19.6850	19.3273	18.9756 (90)	

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

Living area fraction									FLA = Living area / (4) =	0.4159 (91)		
MIT	19.3802	19.5063	19.7775	20.1091	20.3019	20.3553	20.3610	20.3605	20.3317	20.1030	19.7344	19.3848 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.2302	19.3563	19.6275	19.9591	20.1519	20.2053	20.2110	20.2105	20.1817	19.9530	19.5844	19.2348 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9836	0.9757	0.9448	0.8475	0.6576	0.4203	0.2751	0.3041	0.5999	0.8832	0.9668	0.9861 (94)
Useful gains	566.9987	612.0875	671.0467	706.5891	597.9520	401.5515	245.1513	244.9157	418.8904	527.1766	537.4401	538.9826 (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	1202.4877	1169.1921	1051.3177	873.6508	636.8982	405.2606	245.4995	245.4604	437.0065	692.5965	946.3904	1175.9078 (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	472.8038	374.3742	282.9216	120.2844	28.9760	0.0000	0.0000	0.0000	0.0000	123.0724	294.4442	473.8724 (98)
RHI space heating demand												2170.7491 (98)
												2171 (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 (m2)	Storey height (m)	Volume (m3)
Ground floor	69.3700 (1b)	x 2.5100 (2b)	= 174.1187 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	69.3700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 174.1187 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 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					1	(19)
Shelter factor					(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor					(21) = (18) x (20) =	0.2317 (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	0.2954	0.2896	0.2838	0.2549	0.2491	0.2201	0.2201	0.2143	0.2317	0.2491	0.2607	0.2723 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												0.5000 (23a)
Effective ac	0.5454	0.5396	0.5338	0.5049	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5107	0.5223 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Windows (Uw = 1.40)			12.6000	1.3258	16.7045		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Flr - Ground			69.3710	0.1500	10.4057	70.5600	4894.8178 (28a)
Wl - Brick	45.7180	12.6000	33.1180	0.2800	9.2730	104.1000	3447.5838 (29a)
Wl - To Corridor	27.6100	2.1170	25.4930	0.2499	6.3710	106.6200	2718.0637 (29a)
Total net area of external elements Aum(A, m2)			142.7020				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	45.2982		(33)
Party Wall			14.0940	0.0000	0.0000	54.0300	761.4988 (32)
Party Ceiling			69.3710			70.0000	4855.9700 (32b)
Ground Floor Stud			137.2920			5.8200	799.0393 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		17476.9734 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							251.9385 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							10.3084 (36)
Total fabric heat loss					(33) + (36) =		55.6066 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	31.3402	31.0073	30.6745	29.0102	28.7296	28.7296	28.7296	28.7296	28.7296	28.7296	29.3431	30.0088 (38)
Heat transfer coeff	86.9468	86.6139	86.2811	84.6168	84.3362	84.3362	84.3362	84.3362	84.3362	84.3362	84.9497	85.6154 (39)
Average = Sum(39)m / 12 =												85.0867 (39)
HLP	1.2534	1.2486	1.2438	1.2198	1.2157	1.2157	1.2157	1.2157	1.2157	1.2157	1.2246	1.2342 (40)
HLP (average)												1.2266 (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												2.2307 (42)
Average daily hot water use (litres/day)												87.1799 (43)
Daily hot water use	95.8979	92.4107	88.9235	85.4363	81.9491	78.4619	78.4619	81.9491	85.4363	88.9235	92.4107	95.8979 (44)
Energy conte	142.2138	124.3811	128.3502	111.8988	107.3695	92.6518	85.8555	98.5204	99.6971	116.1873	126.8275	137.7265 (45)
Energy content (annual)												Total = Sum(45)m = 1371.6794 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

Distribution loss (46)m = 0.15 x (45)m	21.3321	18.6572	19.2525	16.7848	16.1054	13.8978	12.8783	14.7781	14.9546	17.4281	19.0241	20.6590 (46)
Water storage loss:												
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	14.6261	13.1859	14.5593	14.0451	14.4809	13.9764	14.4190	14.4591	14.0138	14.5269	14.1099	14.6131 (61)
Total heat required for water heating calculated for each month	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (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	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (64)
Heat gains from water heating, kWh/month	50.9426	44.6532	46.3163	40.7176	39.3206	34.3008	32.1517	36.3728	36.6527	42.2640	45.6976	49.4473 (65)
Solar input (sum of months) = Sum(63)m = 0.0000 (63)												
Total per year (kWh/year) = Sum(64)m = 1542.6949 (64)												

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	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	44.5128	39.5359	32.1527	24.3417	18.1957	15.3616	16.5987	21.5756	28.9588	36.7698	42.9158	45.7499 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	292.2720	295.3049	287.6621	271.3917	250.8531	231.5498	218.6540	215.6211	223.2638	239.5343	260.0728	279.3762 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151 (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)	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293 (71)
Water heating gains (Table 5)	68.4712	66.4482	62.2530	56.5523	52.8503	47.6400	43.2146	48.8882	50.9066	56.8064	63.4689	66.4615 (72)
Total internal gains	503.4858	499.5187	480.2977	450.5154	420.1289	392.7811	376.6971	384.3147	401.3590	431.3403	464.6874	489.8174 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b	g Specific data or Table 6c	FF	Access factor Table 6d	Gains W					
Northeast	7.5600	11.2829	0.5000	0.5000	0.0000	0.7700	32.8401 (75)					
Northwest	5.0400	11.2829	0.5000	0.5000	0.0000	0.7700	21.8934 (81)					
Solar gains	54.7335	111.4117	200.7285	329.6538	443.1194	472.4122	441.9319	352.3133	244.5908	136.1540	68.8690	44.6982 (83)
Total gains	558.2194	610.9304	681.0262	780.1692	863.2483	865.1934	818.6291	736.6280	645.9498	567.4943	533.5563	534.5155 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation factor for gains for living area, nil,m (see Table 9a)	55.8355	56.0501	56.2663	57.3729	57.5638	57.5638	57.5638	57.5638	57.5638	57.5638	57.1481	56.7038
tau	4.7224	4.7367	4.7511	4.8249	4.8376	4.8376	4.8376	4.8376	4.8376	4.8376	4.8099	4.7803
alpha	0.9932	0.9886	0.9739	0.9193	0.7867	0.5983	0.4478	0.5152	0.7828	0.9534	0.9879	0.9944 (86)
util living area	19.8144	19.9550	20.2222	20.5925	20.8601	20.9706	20.9941	20.9888	20.8986	20.5531	20.1321	19.7981 (87)
MIT	19.8775	19.8813	19.8851	19.9042	19.9074	19.9074	19.9074	19.9074	19.9074	19.9074	19.9004	19.8927 (88)
Th 2	0.9910	0.9849	0.9650	0.8926	0.7265	0.5068	0.3395	0.3986	0.6983	0.9321	0.9831	0.9926 (89)
util rest of house	18.8192	18.9613	19.2266	19.5923	19.8209	19.8953	19.9061	19.9046	19.8559	19.5670	19.1531	18.8152 (90)
Living area fraction	19.2331	19.3746	19.6406	20.0083	20.2531	20.3425	20.3586	20.3555	20.2895	19.9771	19.5603	19.2240 (92)
MIT	19.0831	19.2246	19.4906	19.8583	20.1031	20.1925	20.2086	20.2055	20.1395	19.8271	19.4103	19.0740 (93)
Temperature adjustment												-0.1500
adjusted MIT												19.0740 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	552.0167	599.9235	654.4611	695.3833	637.2470	459.9127	302.7332	317.6586	463.8560	527.8620	523.0778	529.5927 (95)
Ext temp.	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)
Heat loss rate W	1285.3440	1240.7077	1120.8468	927.2538	708.6860	471.6507	304.3325	320.9382	509.3510	778.1804	1045.7531	1273.4444 (97)
Month fracti	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 kWh	545.5955	430.6070	346.9910	166.9468	53.1506	0.0000	0.0000	0.0000	0.0000	186.2369	376.3262	553.4257 (98)
Space heating												2659.2796 (98)
Space heating per m2												38.3347 (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													2938.4305 (211)
Space heating requirement	545.5955	430.6070	346.9910	166.9468	53.1506	0.0000	0.0000	0.0000	0.0000	186.2369	376.3262	553.4257	(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)	602.8679	475.8088	383.4154	184.4716	58.7300	0.0000	0.0000	0.0000	0.0000	205.7867	415.8301	611.5201	(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	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396	(64)
Efficiency of water heater (217)m	89.7653	89.7039	89.5425	89.0957	88.2477	87.3000	87.3000	87.3000	87.3000	89.1523	89.6051	89.7896	(217)
Fuel for water heating, kWh/month	174.7221	153.3568	159.5995	141.3580	138.0777	122.1399	114.8619	129.4153	130.2530	146.6190	157.2873	169.6629	(219)
Water heating fuel used													1737.3535 (219)
Annual totals kWh/year													
Space heating fuel - main system													2938.4305 (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)													51.4169 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													126.4169 (231)
Electricity for lighting (calculated in Appendix L)													314.4438 (232)
Total delivered energy for all uses													5116.6448 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2938.4305	3.4800	102.2574	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1737.3535	3.4800	60.4599	(247)
Mechanical ventilation fans	51.4169	13.1900	6.7819	(249)
Pumps and fans for heating	75.0000	13.1900	9.8925	(249)
Energy for lighting	314.4438	13.1900	41.4751	(250)
Additional standing charges			120.0000	(251)
Total energy cost			340.8668	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.2518 (257)
SAP value		82.5379
SAP rating (Section 12)		83 (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	2938.4305	0.2160	634.7010	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1737.3535	0.2160	375.2684	(264)
Space and water heating			1009.9694	(265)
Pumps and fans	126.4169	0.5190	65.6104	(267)
Energy for lighting	314.4438	0.5190	163.1963	(268)
Total kg/year			1238.7761	(272)
CO2 emissions per m2			17.8600	(273)
EI value			85.4861	
EI rating			85	(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	$3.48 / 0.8868 = 3.924$, stars = 4
Water heating environmental impact	$0.216 / 0.8868 = 0.2436$, 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 (m2)	Storey height (m)	Volume (m3)
Ground floor	69.3700 (1b)	x 2.5100 (2b)	= 174.1187 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	69.3700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 174.1187 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 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				1	(19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.9250 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2317 (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	0.2954	0.2723	0.2665	0.2491	0.2491	0.2317	0.2317	0.2259	0.2317	0.2607	0.2549	0.2723 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5454	0.5223	0.5165	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5107	0.5049	0.5223 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Windows (Uw = 1.40)			12.6000	1.3258	16.7045		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Flr - Ground			69.3710	0.1500	10.4057	70.5600	4894.8178 (28a)
Wl - Brick	45.7180	12.6000	33.1180	0.2800	9.2730	104.1000	3447.5838 (29a)
Wl - To Corridor	27.6100	2.1170	25.4930	0.2499	6.3710	106.6200	2718.0637 (29a)
Total net area of external elements Aum(A, m2)			142.7020				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	45.2982		(33)
Party Wall			14.0940	0.0000	0.0000	54.0300	761.4988 (32)
Party Ceiling			69.3710			70.0000	4855.9700 (32b)
Ground Floor Stud			137.2920			5.8200	799.0393 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	17476.9734 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							251.9385 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							10.3084 (36)
Total fabric heat loss						(33) + (36) =	55.6066 (37)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	31.3402	30.0088	29.6759	28.7296	28.7296	28.7296	28.7296	28.7296	28.7296	29.3431	29.0102	30.0088 (38)
Heat transfer coeff	86.9468	85.6154	85.2825	84.3362	84.3362	84.3362	84.3362	84.3362	84.3362	84.9497	84.6168	85.6154 (39)
Average = Sum(39)m / 12 =												84.9203 (39)
HLP	1.2534	1.2342	1.2294	1.2157	1.2157	1.2157	1.2157	1.2157	1.2157	1.2246	1.2198	1.2342 (40)
HLP (average)												1.2242 (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												2.2307 (42)
Average daily hot water use (litres/day)												87.1799 (43)
Daily hot water use	95.8979	92.4107	88.9235	85.4363	81.9491	78.4619	78.4619	81.9491	85.4363	88.9235	92.4107	95.8979 (44)
Energy conte	142.2138	124.3811	128.3502	111.8988	107.3695	92.6518	85.8555	98.5204	99.6971	116.1873	126.8275	137.7265 (45)
Energy content (annual)										Total = Sum(45)m =		1371.6794 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

Distribution loss (46)m = 0.15 x (45)m	21.3321	18.6572	19.2525	16.7848	16.1054	13.8978	12.8783	14.7781	14.9546	17.4281	19.0241	20.6590 (46)
Water storage loss:												
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	14.6261	13.1859	14.5593	14.0451	14.4809	13.9764	14.4190	14.4591	14.0138	14.5269	14.1099	14.6131 (61)
Total heat required for water heating calculated for each month	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (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	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (64)
Heat gains from water heating, kWh/month	50.9426	44.6532	46.3163	40.7176	39.3206	34.3008	32.1517	36.3728	36.6527	42.2640	45.6976	49.4473 (65)
Solar input (sum of months) = Sum(63)m = 0.0000 (63)												
Total per year (kWh/year) = Sum(64)m = 1542.6949 (64)												

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	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	44.5128	39.5359	32.1527	24.3417	18.1957	15.3616	16.5987	21.5756	28.9588	36.7698	42.9158	45.7499 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	292.2720	295.3049	287.6621	271.3917	250.8531	231.5498	218.6540	215.6211	223.2638	239.5343	260.0728	279.3762 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151 (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)	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293 (71)
Water heating gains (Table 5)	68.4712	66.4482	62.2530	56.5523	52.8503	47.6400	43.2146	48.8882	50.9066	56.8064	63.4689	66.4615 (72)
Total internal gains	503.4858	499.5187	480.2977	450.5154	420.1289	392.7811	376.6971	384.3147	401.3590	431.3403	464.6874	489.8174 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Northeast	7.5600	15.0428	0.5000	0.0000	0.7700	43.7837 (75)						
Northwest	5.0400	15.0428	0.5000	0.0000	0.7700	29.1891 (81)						
Solar gains	72.9728	127.8097	229.9190	383.2570	489.2236	562.5735	514.4496	421.1234	296.8978	165.5672	91.1847	56.7668 (83)
Total gains	576.4586	627.3284	710.2167	833.7724	909.3525	955.3547	891.1467	805.4381	698.2568	596.9075	555.8721	546.5842 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (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	55.8355	56.7038	56.9251	57.5638	57.5638	57.5638	57.5638	57.5638	57.5638	57.1481	57.3729	56.7038
alpha	4.7224	4.7803	4.7950	4.8376	4.8376	4.8376	4.8376	4.8376	4.8376	4.8099	4.8249	4.7803
util living area	0.9898	0.9843	0.9618	0.8820	0.7120	0.4859	0.3487	0.3850	0.6751	0.9183	0.9789	0.9915 (86)
MIT	19.9621	20.0823	20.3563	20.6994	20.9189	20.9893	20.9983	20.9974	20.9540	20.6901	20.3063	19.9594 (87)
Th 2	19.8775	19.8927	19.8966	19.9074	19.9074	19.9074	19.9074	19.9074	19.9074	19.9004	19.9042	19.8927 (88)
util rest of house	0.9863	0.9790	0.9488	0.8455	0.6406	0.3951	0.2465	0.2726	0.5725	0.8810	0.9701	0.9885 (89)
MIT 2	18.9658	19.0963	19.3654	19.6889	19.8626	19.9039	19.9072	19.9070	19.8887	19.6850	19.3273	18.9756 (90)
Living area fraction	19.3802	19.5063	19.7775	20.1091	20.3019	20.3553	20.3610	20.3605	20.3317	20.1030	19.7344	19.3848 (92)
Temperature adjustment	19.2302	19.3563	19.6275	19.9591	20.1519	20.2053	20.2110	20.2105	20.1817	19.9530	19.5844	-0.1500 (93)
adjusted MIT												19.2348 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9836	0.9757	0.9448	0.8475	0.6576	0.4203	0.2751	0.3041	0.5999	0.8832	0.9668	0.9861 (94)
Ext temp.	566.9987	612.0875	671.0467	706.5891	597.9520	401.5515	245.1513	244.9157	418.8904	527.1766	537.4401	538.9826 (95)
Heat loss rate W	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)
Month fracti	1202.4877	1169.1921	1051.3177	873.6508	636.8982	405.2606	245.4995	245.4604	437.0065	692.5965	946.3904	1175.9078 (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 per m2	472.8038	374.3742	282.9216	120.2844	28.9760	0.0000	0.0000	0.0000	0.0000	123.0724	294.4442	473.8724 (98)
(98) / (4) = 31.2923 (99)												

8c. Space cooling requirement

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													2398.6178 (211)
Space heating requirement	472.8038	374.3742	282.9216	120.2844	28.9760	0.0000	0.0000	0.0000	0.0000	123.0724	294.4442	473.8724	(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)	522.4351	413.6732	312.6206	132.9110	32.0176	0.0000	0.0000	0.0000	0.0000	135.9916	325.3527	523.6159	(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	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396	(64)
Efficiency of water heater (217)m	89.6812	89.6173	89.4002	88.8345	87.8971	87.3000	87.3000	87.3000	87.3000	88.8231	89.4388	89.7001	(217)
Fuel for water heating, kWh/month	174.8861	153.5050	159.8536	141.7737	138.6285	122.1399	114.8619	129.4153	130.2530	147.1624	157.5798	169.8321	(219)
Water heating fuel used													1739.8914 (219)
Annual totals kWh/year													
Space heating fuel - main system													2398.6178 (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)													51.4169 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													126.4169 (231)
Electricity for lighting (calculated in Appendix L)													314.4438 (232)
Total delivered energy for all uses													4579.3699 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2398.6178	3.8700	92.8265 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1739.8914	3.8700	67.3338 (247)
Mechanical ventilation fans	51.4169	18.9000	9.7178 (249)
Pumps and fans for heating	75.0000	18.9000	14.1750 (249)
Energy for lighting	314.4438	18.9000	59.4299 (250)
Additional standing charges			93.0000 (251)
Total energy cost			336.4830 (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	2398.6178	0.2160	518.1014 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1739.8914	0.2160	375.8165 (264)
Space and water heating			893.9180 (265)
Pumps and fans	126.4169	0.5190	65.6104 (267)
Energy for lighting	314.4438	0.5190	163.1963 (268)
Total kg/year			1122.7247 (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	2398.6178	1.2200	2926.3137 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1739.8914	1.2200	2122.6675 (264)
Space and water heating			5048.9811 (265)
Pumps and fans	126.4169	3.0700	388.0999 (267)
Energy for lighting	314.4438	3.0700	965.3426 (268)
Primary energy kWh/year			6402.4237 (272)
Primary energy kWh/m2/year			92.2938 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 83
Current environmental impact rating: B 85

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	Already installed
F		Not considered
G		Not considered
H		Not considered
I		Not considered
J		Not considered
K		Not considered
M		Not considered
N	Solar water heating	Not applicable
O		Not considered
P		Not considered
R		Not considered
S		Not considered
T		Not considered
U	Solar photovoltaic panels	Not applicable
A2		Not considered
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	Not applicable
L2		Not considered
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 83
 Potential environmental impact rating: B 85

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	£83	£83	£0
Mains gas	£253	£253	£0
Space heating	£210	£210	£0
Water heating	£67	£67	£0
Lighting	£59	£59	£0
Total cost of fuels	£336	£336	£0
Total cost of uses	£336	£336	£0
Delivered energy	66 kWh/m ²	66 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	1.1 tonnes	1.1 tonnes	0.0 tonnes
CO2 emissions per m ²	16 kg/m ²	16 kg/m ²	0 kg/m ²
Primary energy	92 kWh/m ²	92 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	517 - PRJ009194 - GF	Issued on Date	26/02/2021
Assessment Reference	517 E	Prop Type Ref	Block B - GF
Property	517 - PRJ009194 - GF		

SAP Rating	83 B	DER	20.04	TER	20.26
Environmental	85 B	% DER<TER	1.10		
CO₂ Emissions (t/year)	1.12	DFEE	54.90	TFEE	57.97
General Requirements Compliance	Pass	% DFEE<TFEE	5.29		

Assessor Details	Mr. Michael Jukes, Michael Jukes, 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)	20.26	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	20.04	kgCO ₂ /m ²	Pass
	-0.22 (-1.1%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	57.97	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	54.90	kWh/m ² /yr	
	-3.1 (-5.3%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.27 (max. 0.30)	0.28 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.15 (max. 0.25)	0.15 (max. 0.70)	Pass
Openings	1.37 (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
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BASIC COMPLIANCE REPORT

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

7.56 m², No overhang

Windows facing North West

5.04 m², No overhang

Air change rate

4.21 ach

Blinds/curtains

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

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type

U-value

Filled Cavity with Edge Sealing

0.00

W/m²K

Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.01 (design value)

Maximum

10.0

Pass

10 Key features

Party wall U-value

0.00

W/m²K

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