

PREDICTED ENERGY ASSESSMENT



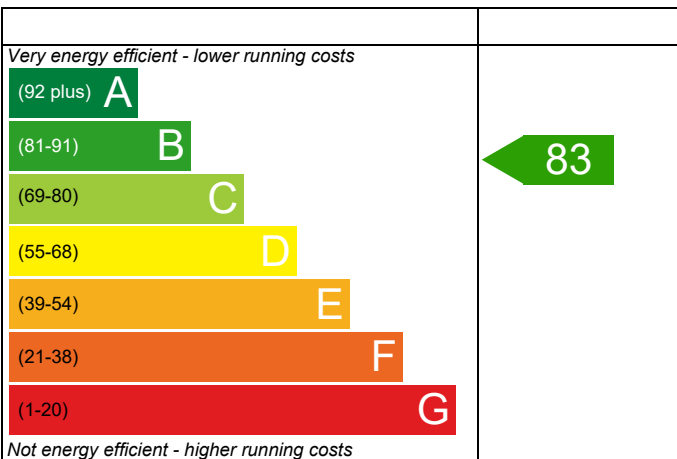
Plot 681

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.

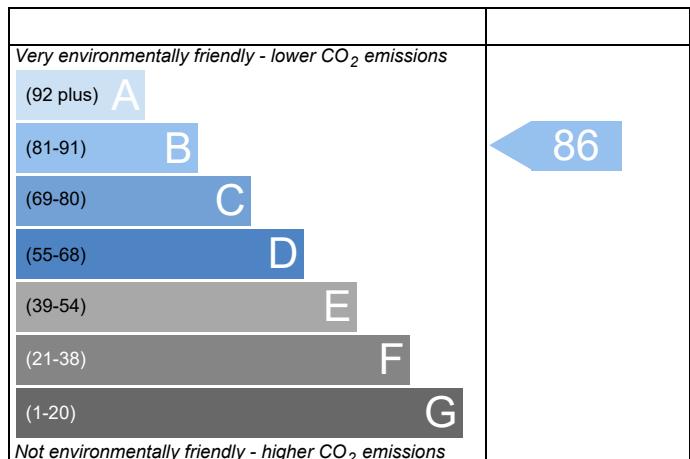
Energy Efficiency Rating



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	681 - PRJ009149		Issued on Date	26/02/2021	
Assessment Reference	681	Prop Type Ref	Block B		
Property	Plot 681				
SAP Rating	83 B	DER	18.62	TER	19.18
Environmental	86 B	% DER<TER	2.91		
CO ₂ Emissions (t/year)	1.04	DFEE	49.23	TFEE	52.58
General Requirements Compliance	Pass	% DFEE<TFEE	6.38		
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)	19.18	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	18.62	kgCO ₂ /m ²	Pass
	-0.56 (-2.9%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	52.58	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	49.23	kWh/m ² /yr	
	-3.4 (-6.5%)	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	
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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 South West	7.56 m ² , No overhang	
Windows facing North West	5.04 m ² , 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/m ² K	Pass

Air permeability and pressure testing

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

10 Key features

Party wall U-value	0.00	W/m ² K	
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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	681 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	681	Prop Type Ref	Block B
Property	Plot 681		

SAP Rating	83 B	DER	18.62	TER	19.18
Environmental	86 B	% DER<TER	2.91		
CO ₂ Emissions (t/year)	1.04	DFEE	49.23	TTEE	52.58
General Requirements Compliance	Pass	% DFEE<TTEE	6.38		

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) =				Air changes per hour	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)

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

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	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)
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	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)
RHI water heating demand												Total per year (kWh/year) = Sum(64)m = 1542.6949 (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

	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 data Table 6d	Gains W						
Southwest	7.5600	46.3896	0.5000	0.0000	0.7700	135.0216 (79)						
Northwest	5.0400	15.0428	0.5000	0.0000	0.7700	29.1891 (81)						
Solar gains	164.2107	247.5575	359.6711	492.9573	561.5131	619.3769	576.3337	513.2728	426.6378	295.8659	196.6761	133.0806 (83)
Total gains	667.6965	747.0762	839.9688	943.4727	981.6420	1012.1580	953.0308	897.5875	827.9968	727.2062	661.3634	622.8979 (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	0.9818	0.9695	0.9322	0.8364	0.6730	0.4603	0.3264	0.3463	0.5879	0.8563	0.9596	0.9855 (86)
MIT	20.0743	20.2238	20.4889	20.7709	20.9364	20.9915	20.9987	20.9984	20.9744	20.7891	20.4266	20.0548 (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	0.9758	0.9599	0.9118	0.7931	0.6015	0.3735	0.2306	0.2448	0.4910	0.8042	0.9445	0.9807 (89)
MIT 2	19.0755	19.2327	19.4874	19.7465	19.8731	19.9047	19.9072	19.9072	19.8976	19.7633	19.4407	19.0692 (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	19.4909	19.6449	19.9039	20.1725	20.3153	20.3567	20.3612	20.3610	20.3454	20.1899	19.8507	19.4791 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.3409	19.4949	19.7539	20.0225	20.1653	20.2067	20.2112	20.2110	20.1954	20.0399	19.7007	19.3291 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9722	0.9557	0.9087	0.7981	0.6192	0.3976	0.2573	0.2731	0.5174	0.8117	0.9411	0.9775 (94)
Useful gains	649.1355	713.9894	763.2437	752.9875	607.8015	402.4561	245.2598	245.1645	428.4340	590.2798	622.3820	608.8540 (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	1212.1152	1181.0561	1062.1008	878.9954	638.0287	405.3756	245.5177	245.5017	438.1642	699.9767	956.2313	1183.9816 (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	418.8569	313.8688	222.3497	90.7257	22.4891	0.0000	0.0000	0.0000	0.0000	81.6145	240.3715	427.8949 (98)
RHI space heating demand												1818.1711 (98)
												1818 (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:												
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)

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 m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Southwest	7.5600	36.7938	0.5000	0.0000	0.7700	107.0921 (79)						
Northwest	5.0400	11.2829	0.5000	0.0000	0.7700	21.8934 (81)						
Solar gains	128.9855	226.9822	329.8830	441.1176	523.6404	532.8526	508.3172	444.7642	368.0912	256.0718	155.8193	109.5278 (83)
Total gains	632.4714	726.5009	810.1807	891.6330	943.7692	925.6337	885.0143	829.0789	769.4502	687.4121	620.5066	599.3452 (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)												
tau	55.8355	56.0501	56.2663	57.3729	57.5638	57.5638	57.5638	57.5638	57.5638	57.5638	57.1481	56.7038
alpha	4.7224	4.7367	4.7511	4.8249	4.8376	4.8376	4.8376	4.8376	4.8376	4.8376	4.8099	4.7803
util living area	0.9888	0.9776	0.9513	0.8802	0.7442	0.5644	0.4156	0.4615	0.6969	0.9123	0.9780	0.9911 (86)
MIT	19.9081	20.0954	20.3644	20.6823	20.8910	20.9770	20.9957	20.9930	20.9393	20.6676	20.2380	19.8809 (87)
Th 2	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)
util rest of house	0.9852	0.9707	0.9363	0.8458	0.6813	0.4760	0.3144	0.3552	0.6085	0.8787	0.9699	0.9882 (89)
MIT 2	18.9116	19.0982	19.3608	19.6690	19.8419	19.8981	19.9065	19.9057	19.8788	19.6668	19.2558	18.8970 (90)
Living area fraction	19.3260	19.5130	19.7782	20.0904	20.2782	20.3468	20.3595	20.3579	20.3198	20.0830	19.6642	19.3062 (92)
Temperature adjustment	19.1760	19.3630	19.6282	19.9404	20.1282	20.1968	20.2095	20.2079	20.1698	19.9330	19.5142	-0.1500
adjusted MIT												19.1562 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9823	0.9667	0.9322	0.8470	0.6948	0.5001	0.3427	0.3849	0.6311	0.8796	0.9663	0.9857 (94)
Useful gains	621.2631	702.3295	755.2414	755.2567	655.7619	462.9388	303.2629	319.1319	485.6102	604.6583	599.6256	590.7761 (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	1293.4209	1252.6946	1132.7130	934.2048	710.8060	472.0148	304.4085	321.1411	511.9051	787.1138	1054.5864	1280.4812 (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	500.0854	369.8454	280.8389	128.8426	40.9528	0.0000	0.0000	0.0000	0.0000	135.7469	327.5718	513.1406 (98)
Space heating												2297.0243 (98)
Space heating per m ²												33.1126 (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													2538.1484 (211)
Space heating requirement	500.0854	369.8454	280.8389	128.8426	40.9528	0.0000	0.0000	0.0000	0.0000	135.7469	327.5718	513.1406	(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)	552.5805	408.6689	310.3192	142.3676	45.2517	0.0000	0.0000	0.0000	0.0000	149.9965	361.9577	567.0062	(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	89.7149	89.6095	89.3949	88.8894	88.0835	87.3000	87.3000	87.3000	87.3000	88.9014	89.5130	89.7469	(217)
Fuel for water heating, kWh/month	174.8204	153.5184	159.8631	141.6861	138.3352	122.1399	114.8619	129.4153	130.2530	147.0327	157.4492	169.7435	(219)
Water heating fuel used													1739.1187 (219)
Annual totals kWh/year													
Space heating fuel - main system													2538.1484 (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													4718.1278 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2538.1484	3.4800	88.3276	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1739.1187	3.4800	60.5213	(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			326.9984	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.2008 (257)
SAP value		83.2484
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	2538.1484	0.2160	548.2400	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1739.1187	0.2160	375.6496	(264)
Space and water heating			923.8897	(265)
Pumps and fans	126.4169	0.5190	65.6104	(267)
Energy for lighting	314.4438	0.5190	163.1963	(268)
Total kg/year			1152.6964	(272)
CO2 emissions per m2			16.6200	(273)
EI value			86.4946	
EI rating			86	(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	$3.48 / 0.8859 = 3.928$, stars = 4
Water heating environmental impact	$0.216 / 0.8859 = 0.2438$, 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)

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	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)

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 m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Southwest	7.5600	46.3896	0.5000	0.0000	0.7700	135.0216 (79)						
Northwest	5.0400	15.0428	0.5000	0.0000	0.7700	29.1891 (81)						
Solar gains	164.2107	247.5575	359.6711	492.9573	561.5131	619.3769	576.3337	513.2728	426.6378	295.8659	196.6761	133.0806 (83)
Total gains	667.6965	747.0762	839.9688	943.4727	981.6420	1012.1580	953.0308	897.5875	827.9968	727.2062	661.3634	622.8979 (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	0.9818	0.9695	0.9322	0.8364	0.6730	0.4603	0.3264	0.3463	0.5879	0.8563	0.9596	0.9855 (86)
MIT	20.0743	20.2238	20.4889	20.7709	20.9364	20.9915	20.9987	20.9984	20.9744	20.7891	20.4266	20.0548 (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	0.9758	0.9599	0.9118	0.7931	0.6015	0.3735	0.2306	0.2448	0.4910	0.8042	0.9445	0.9807 (89)
MIT 2	19.0755	19.2327	19.4874	19.7465	19.8731	19.9047	19.9072	19.9072	19.8976	19.7633	19.4407	19.0692 (90)
Living area fraction	19.4909	19.6449	19.9039	20.1725	20.3153	20.3567	20.3612	20.3610	20.3454	fLA = Living area / (4) =	20.1899	19.8507
Temperature adjustment	19.3409	19.4949	19.7539	20.0225	20.1653	20.2067	20.2112	20.2110	20.1954	20.0399	19.7007	-0.1500
adjusted MIT												19.3291 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9722	0.9557	0.9087	0.7981	0.6192	0.3976	0.2573	0.2731	0.5174	0.8117	0.9411	0.9775 (94)
Ext temp.	649.1355	713.9894	763.2437	752.9875	607.8015	402.4561	245.2598	245.1645	428.4340	590.2798	622.3820	608.8540 (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	1212.1152	1181.0561	1062.1008	878.9954	638.0287	405.3756	245.5177	245.5017	438.1642	699.9767	956.2313	1183.9816 (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	418.8569	313.8688	222.3497	90.7257	22.4891	0.0000	0.0000	0.0000	0.0000	81.6145	240.3715	427.8949 (98)
												1818.1711 (98)
												(98) / (4) =
												26.2098 (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													2009.0289 (211)
Space heating requirement	418.8569	313.8688	222.3497	90.7257	22.4891	0.0000	0.0000	0.0000	0.0000	81.6145	240.3715	427.8949	(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)	462.8253	346.8164	245.6903	100.2494	24.8498	0.0000	0.0000	0.0000	0.0000	90.1818	265.6038	472.8121	(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	89.6052	89.5003	89.2204	88.6120	87.7836	87.3000	87.3000	87.3000	87.3000	88.5029	89.2903	89.6374	(216)
Fuel for water heating, kWh/month	175.0344	153.7057	160.1757	142.1296	138.8077	122.1399	114.8619	129.4153	130.2530	147.6948	157.8419	169.9511	(219)
Water heating fuel used													1742.0110 (219)
Annual totals kWh/year													
Space heating fuel - main system													2009.0289 (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													4191.9006 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2009.0289	3.8700	77.7494 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1742.0110	3.8700	67.4158 (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			321.4879 (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	2009.0289	0.2160	433.9502 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1742.0110	0.2160	376.2744 (264)
Space and water heating			810.2246 (265)
Pumps and fans	126.4169	0.5190	65.6104 (267)
Energy for lighting	314.4438	0.5190	163.1963 (268)
Total kg/year			1039.0313 (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	2009.0289	1.2200	2451.0152 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1742.0110	1.2200	2125.2534 (264)
Space and water heating			4576.2686 (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			5929.7111 (272)
Primary energy kWh/m2/year			85.4795 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 83
 Current environmental impact rating: B 86

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 86

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	£238	£238	£0
Space heating	£195	£195	£0
Water heating	£67	£67	£0
Lighting	£59	£59	£0
Total cost of fuels	£321	£321	£0
Total cost of uses	£321	£321	£0
Delivered energy	60 kWh/m ²	60 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	1.0 tonnes	1.0 tonnes	0.0 tonnes
CO2 emissions per m ²	15 kg/m ²	15 kg/m ²	0 kg/m ²
Primary energy	85 kWh/m ²	85 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	681 - PRJ009149		Issued on Date	26/02/2021	
Assessment Reference	681	Prop Type Ref	Block B		
Property	Plot 681				
SAP Rating	83 B	DER	18.62	TER	19.18
Environmental	86 B	% DER<TER	2.91		
CO₂ Emissions (t/year)	1.04	DFEE	49.23	TFEE	52.58
General Requirements Compliance	Pass	% DFEE<TFEE	6.38		
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)	19.18	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	18.62	kgCO ₂ /m ²	Pass
	-0.56 (-2.9%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	52.58	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	49.23	kWh/m ² /yr	
	-3.4 (-6.5%)	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 South West

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.