

PREDICTED ENERGY ASSESSMENT

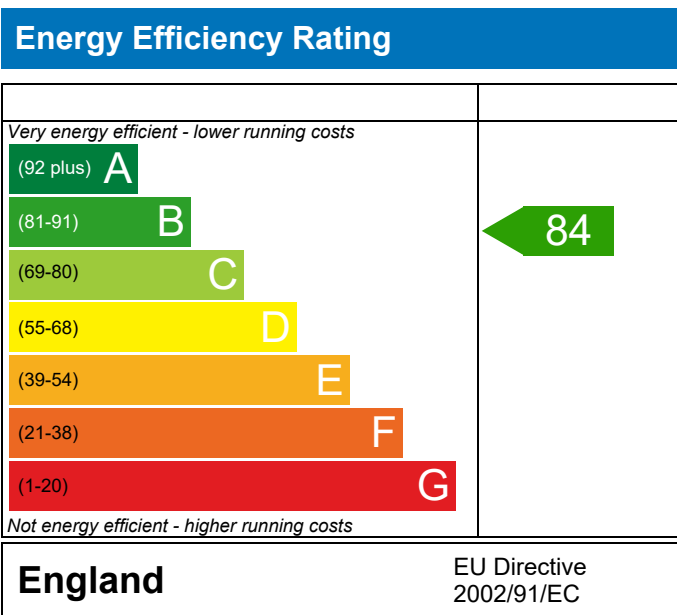


Plot 669

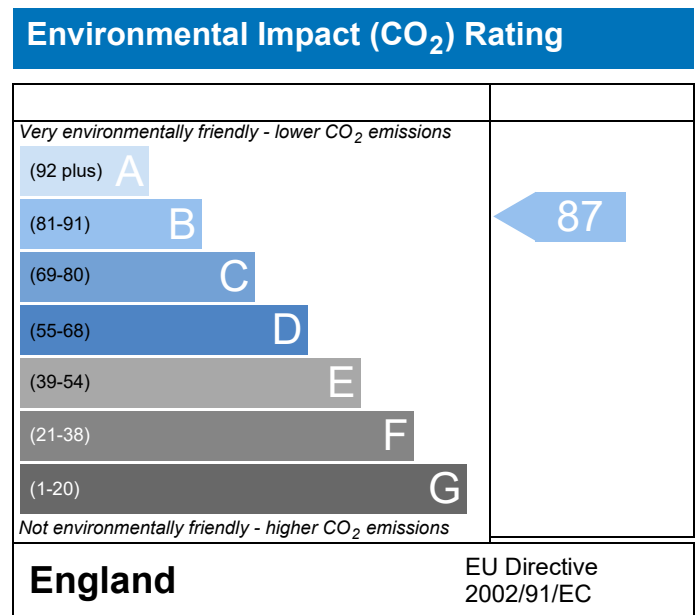
Dwelling type: Flat, End-Terrace
 Date of assessment: 26/02/2021
 Produced by: Michael Juckes
 Total floor area: 69.37 m²

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	669 - PRJ009149		Issued on Date	26/02/2021	
Assessment Reference	669	Prop Type Ref	Block B		
Property	Plot 669				
SAP Rating	84 B	DER	17.74	TER	18.50
Environmental	87 B	% DER<TER	4.10		
CO ₂ Emissions (t/year)	0.99	DFEE	45.74	TFEE	49.22
General Requirements Compliance	Pass	% DFEE<TFEE	7.07		
Assessor Details	Mr. Michael Juckes, Michael Juckes, Tel: 02033971373, michael@briaryenergy.co.uk			Assessor ID	T850-0001
Client					

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	18.50	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	17.74	kgCO ₂ /m ²	Pass
	-0.76 (-4.1%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	49.22	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	45.74	kWh/m ² /yr	
	-3.5 (-7.1%)	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 East	5.04 m ² , No overhang	
Windows facing South West	7.56 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	669 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	669	Prop Type Ref	Block B
Property	Plot 669		

SAP Rating	84 B	DER	17.74	TER	18.50
Environmental	87 B	% DER<TER	4.10		
CO ₂ Emissions (t/year)	0.99	DFEE	45.74	TTEE	49.22
General Requirements Compliance	Pass	% DFEE<TTEE	7.07		

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)

	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)

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

	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						
Southeast	5.0400	46.3896	0.5000	0.0000	0.7700	90.0144 (77)						
Southwest	7.5600	46.3896	0.5000	0.0000	0.7700	135.0216 (79)						
Solar gains	225.0359	327.3893	446.1725	566.0909	609.7061	657.2457	617.5898	574.7057	513.1312	382.7316	267.0036	183.9564 (83)
Total gains	728.5217	826.9080	926.4701	1016.6063	1029.8350	1050.0269	994.2869	959.0204	914.4902	814.0720	731.6910	673.7738 (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	0.9747	0.9560	0.9079	0.8048	0.6483	0.4445	0.3130	0.3244	0.5388	0.8106	0.9426	0.9803 (86)
MIT	20.1463	20.3116	20.5660	20.8095	20.9458	20.9927	20.9990	20.9988	20.9823	20.8385	20.4997	20.1166 (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	0.9667	0.9431	0.8825	0.7581	0.5773	0.3603	0.2210	0.2292	0.4472	0.7518	0.9227	0.9739 (89)
MIT 2	19.1451	19.3159	19.5561	19.7763	19.8785	19.9051	19.9073	19.9072	19.9009	19.7994	19.5078	19.1293 (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	19.5615	19.7300	19.9761	20.2060	20.3224	20.3574	20.3613	20.3612	20.3506	20.2315	19.9203	19.5399 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.4115	19.5800	19.8261	20.0560	20.1724	20.2074	20.2113	20.2112	20.2006	20.0815	19.7703	19.3899 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9626	0.9387	0.8807	0.7650	0.5952	0.3837	0.2467	0.2557	0.4724	0.7625	0.9198	0.9702 (94)
Useful gains	701.2498	776.2435	815.9047	777.6607	613.0085	402.9339	245.3137	245.2684	431.9821	620.6978	673.0134	653.7037 (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	1218.2546	1188.3405	1068.2566	881.8174	638.6257	405.4366	245.5268	245.5192	438.5991	703.5110	962.1205	1189.1875 (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	384.6516	276.9292	187.7498	74.9928	19.0592	0.0000	0.0000	0.0000	0.0000	61.6130	208.1571	398.4000 (98)
RHI space heating demand												1611.5526 (98)
												1612 (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)	2.5100 (2b)	174.1187 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	69.3700		174.1187 (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	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Southeast	5.0400	36.7938	0.5000	0.0000	0.7700	71.3948 (77)						
Southwest	7.5600	36.7938	0.5000	0.0000	0.7700	107.0921 (79)						
Solar gains	178.4869	304.0292	415.9860	515.4268	577.3210	573.1461	552.5740	506.3982	450.4249	336.0170	213.7861	152.7476 (83)
Total gains	681.9727	803.5479	896.2837	965.9422	997.4498	965.9273	929.2711	890.7129	851.7838	767.3574	678.4735	642.5650 (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)												21.0000 (85)
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	0.9848	0.9675	0.9318	0.8515	0.7167	0.5435	0.3965	0.4311	0.6448	0.8790	0.9692	0.9881 (86)
MIT	19.9692	20.1843	20.4497	20.7324	20.9076	20.9804	20.9965	20.9947	20.9565	20.7306	20.3053	19.9352 (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	0.9802	0.9580	0.9125	0.8128	0.6528	0.4573	0.2995	0.3310	0.5575	0.8380	0.9584	0.9844 (89)
MIT 2	18.9715	19.1836	19.4392	19.7101	19.8529	19.8996	19.9067	19.9062	19.8876	19.7187	19.3200	18.9504 (90)
Living area fraction	19.3864	19.5997	19.8595	20.1353	20.2915	20.3491	20.3599	20.3589	20.3321	20.1395	19.7298	19.3600 (91)
MIT	19.3864	19.5997	19.8595	20.1353	20.2915	20.3491	20.3599	20.3589	20.3321	20.1395	19.7298	19.3600 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.2364	19.4497	19.7095	19.9853	20.1415	20.1991	20.2099	20.2089	20.1821	19.9895	19.5798	19.2100 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9767	0.9535	0.9089	0.8159	0.6673	0.4809	0.3266	0.3590	0.5805	0.8415	0.9545	0.9815 (94)
Useful gains	666.1103	766.1678	814.6598	788.1538	665.5793	464.5179	303.5179	319.7439	494.4385	645.7021	647.6206	630.6546 (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	1298.6732	1260.2096	1139.7263	938.0029	711.9258	472.2055	304.4454	321.2264	512.9442	791.8772	1060.1536	1285.0840 (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	470.6268	331.9961	241.8495	107.8914	34.4818	0.0000	0.0000	0.0000	0.0000	108.7543	297.0238	486.8954 (98)
Space heating												2079.5191 (98)
Space heating per m2												(98) / (4) = 29.9772 (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													2297.8111 (211)
Space heating requirement	470.6268	331.9961	241.8495	107.8914	34.4818	0.0000	0.0000	0.0000	0.0000	108.7543	297.0238	486.8954	(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)	520.0297	366.8465	267.2370	119.2170	38.1014	0.0000	0.0000	0.0000	0.0000	120.1705	328.2031	538.0060	(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	89.6783	89.5385	89.2844	88.7479	87.9862	87.3000	87.3000	87.3000	87.3000	88.7248	89.4449	89.7163	(217)
Fuel for water heating, kWh/month	174.8916	153.6401	160.0609	141.9120	138.4881	122.1399	114.8619	129.4153	130.2530	147.3255	157.5690	169.8015	(219)
Water heating fuel used													1740.3588 (219)
Annual totals kWh/year													
Space heating fuel - main system													2297.8111 (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													4479.0306 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2297.8111	3.4800	79.9638	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1740.3588	3.4800	60.5645	(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			318.6778	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.1703 (257)
SAP value		83.6746
SAP rating (Section 12)		84 (258)
SAP band		B

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2297.8111	0.2160	496.3272	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1740.3588	0.2160	375.9175	(264)
Space and water heating			872.2447	(265)
Pumps and fans	126.4169	0.5190	65.6104	(267)
Energy for lighting	314.4438	0.5190	163.1963	(268)
Total kg/year			1101.0514	(272)
CO2 emissions per m2			15.8700	(273)
EI value			87.0997	
EI rating			87	(274)
EI band			B	

Calculation of stars for heating and DHW

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.9050 = 3.845$, stars = 4
Main heating environmental impact	$0.216 \times (1 + 0.29 \times 0.00) / 0.9050 = 0.2387$, stars = 4
Water heating energy efficiency	$3.48 / 0.8853 = 3.931$, stars = 4
Water heating environmental impact	$0.216 / 0.8853 = 0.2440$, stars = 4

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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)
												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						
Southeast	5.0400	46.3896	0.5000	0.0000	0.7700	90.0144 (77)						
Southwest	7.5600	46.3896	0.5000	0.0000	0.7700	135.0216 (79)						
Solar gains	225.0359	327.3893	446.1725	566.0909	609.7061	657.2457	617.5898	574.7057	513.1312	382.7316	267.0036	183.9564 (83)
Total gains	728.5217	826.9080	926.4701	1016.6063	1029.8350	1050.0269	994.2869	959.0204	914.4902	814.0720	731.6910	673.7738 (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	56.7038	56.9251	57.5638	57.5638	57.5638	57.5638	57.5638	57.5638	57.1481	57.3729	56.7038
tau	4.7224	4.7803	4.7950	4.8376	4.8376	4.8376	4.8376	4.8376	4.8376	4.8099	4.8249	4.7803
alpha	0.9747	0.9560	0.9079	0.8048	0.6483	0.4445	0.3130	0.3244	0.5388	0.8106	0.9426	0.9803 (86)
util living area	20.1463	20.3116	20.5660	20.8095	20.9458	20.9927	20.9990	20.9988	20.9823	20.8385	20.4997	20.1166 (87)
MIT	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)
Th 2	0.9667	0.9431	0.8825	0.7581	0.5773	0.3603	0.2210	0.2292	0.4472	0.7518	0.9227	0.9739 (89)
util rest of house	19.1451	19.3159	19.5561	19.7763	19.8785	19.9051	19.9073	19.9072	19.9009	19.7994	19.5078	19.1293 (90)
Living area fraction	19.5615	19.7300	19.9761	20.2060	20.3224	20.3574	20.3613	20.3612	20.3506	20.2315	19.9203	19.5399 (92)
MIT	19.5615	19.7300	19.9761	20.2060	20.3224	20.3574	20.3613	20.3612	20.3506	20.2315	19.9203	19.5399 (92)
Temperature adjustment	19.4115	19.5800	19.8261	20.0560	20.1724	20.2074	20.2113	20.2112	20.2006	20.0815	19.7703	-0.1500
adjusted MIT	19.4115	19.5800	19.8261	20.0560	20.1724	20.2074	20.2113	20.2112	20.2006	20.0815	19.7703	19.3899 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9626	0.9387	0.8807	0.7650	0.5952	0.3837	0.2467	0.2557	0.4724	0.7625	0.9198	0.9702 (94)
Ext temp.	701.2498	776.2435	815.9047	777.6607	613.0085	402.9339	245.3137	245.2684	431.9821	620.6978	673.0134	653.7037 (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	1218.2546	1188.3405	1068.2566	881.8174	638.6257	405.4366	245.5268	245.5192	438.5991	703.5110	962.1205	1189.1875 (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	384.6516	276.9292	187.7498	74.9928	19.0592	0.0000	0.0000	0.0000	0.0000	61.6130	208.1571	398.4000 (98)
												1611.5526 (98)
												(98) / (4) = 23.2313 (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													1780.7211 (211)
Space heating requirement	384.6516	276.9292	187.7498	74.9928	19.0592	0.0000	0.0000	0.0000	0.0000	61.6130	208.1571	398.4000	(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)	425.0294	305.9991	207.4583	82.8649	21.0599	0.0000	0.0000	0.0000	0.0000	68.0806	230.0079	440.2209	(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	89.5493	89.4123	89.0886	88.4675	87.7195	87.3000	87.3000	87.3000	87.3000	88.3002	89.1803	89.5916	(217)
Fuel for water heating, kWh/month	175.1437	153.8570	160.4127	142.3618	138.9091	122.1399	114.8619	129.4153	130.2530	148.0338	158.0366	170.0378	(219)
Water heating fuel used													1743.4626 (219)
Annual totals kWh/year													
Space heating fuel - main system													1780.7211 (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													3965.0445 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1780.7211	3.8700	68.9139 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1743.4626	3.8700	67.4720 (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			312.7086 (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	1780.7211	0.2160	384.6358 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1743.4626	0.2160	376.5879 (264)
Space and water heating			761.2237 (265)
Pumps and fans	126.4169	0.5190	65.6104 (267)
Energy for lighting	314.4438	0.5190	163.1963 (268)
Total kg/year			990.0304 (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	1780.7211	1.2200	2172.4797 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1743.4626	1.2200	2127.0244 (264)
Space and water heating			4299.5041 (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			5652.9466 (272)
Primary energy kWh/m2/year			81.4898 (273)

SAP 2012 EPC IMPROVEMENTS

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

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

(For testing purposes):

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

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

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

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

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

	Current	Potential	Saving
Electricity	£83	£83	£0
Mains gas	£229	£229	£0
Space heating	£186	£186	£0
Water heating	£67	£67	£0
Lighting	£59	£59	£0
Total cost of fuels	£312	£312	£0
Total cost of uses	£312	£312	£0
Delivered energy	57 kWh/m ²	57 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	1.0 tonnes	1.0 tonnes	0.0 tonnes
CO2 emissions per m ²	14 kg/m ²	14 kg/m ²	0 kg/m ²
Primary energy	81 kWh/m ²	81 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	669 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	669	Prop Type Ref	Block B
Property	Plot 669		

SAP Rating	84 B	DER	17.74	TER	18.50
Environmental	87 B	% DER<TER	4.10		
CO₂ Emissions (t/year)	0.99	DFEE	45.74	TFEE	49.22
General Requirements Compliance	Pass	% DFEE<TFEE	7.07		

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

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	18.50	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	17.74	kgCO ₂ /m ²	Pass
	-0.76 (-4.1%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	49.22	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	45.74	kWh/m ² /yr	
	-3.5 (-7.1%)	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 East

5.04 m², No overhang

Windows facing South West

7.56 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.