

PREDICTED ENERGY ASSESSMENT



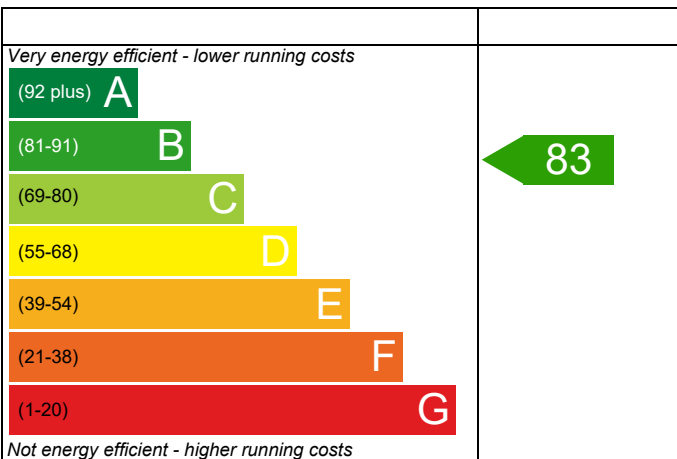
Plot 668

Dwelling type: Flat, Mid-Terrace
 Date of assessment: 26/02/2021
 Produced by: Michael Juckes
 Total floor area: 50.62 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.

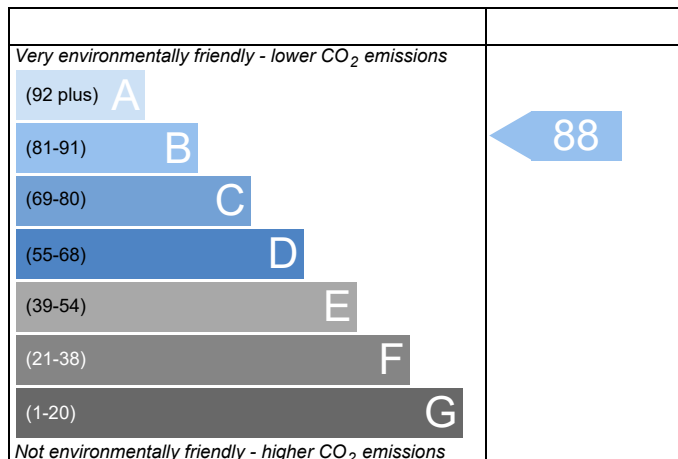
Energy Efficiency Rating



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	668 - PRJ009149		Issued on Date	26/02/2021	
Assessment Reference	668	Prop Type Ref	Block B		
Property	Plot 668				
SAP Rating	83 B	DER	18.94	TER	20.01
Environmental	88 B	% DER<TER	5.34		
CO ₂ Emissions (t/year)	0.78	DFEE	46.90	TFEE	49.99
General Requirements Compliance	Pass	% DFEE<TFEE	6.17		
Assessor Details	Mr. Michael Juckes, Michael Juckes, Tel: 02033971373, michael@briaryenergy.co.uk			Assessor ID	T850-0001
Client					

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	20.01	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	18.94	kgCO ₂ /m ²	Pass
	-1.07 (-5.3%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	49.99	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	46.90	kWh/m ² /yr	
	-3.1 (-6.2%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.28 (max. 0.30)	0.28 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.14 (max. 0.25)	0.14 (max. 0.70)	Pass
Openings	1.37 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.01 (design value)	m ³ /(h.m ²) @ 50 Pa	
Maximum	10.0	m ³ /(h.m ²) @ 50 Pa	Pass

Limiting System Efficiencies

4 Heating efficiency

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BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)



Main heating system

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

Pass

Secondary heating system

None

5 Cylinder insulation

Hot water storage

No cylinder

6 Controls

Space heating controls

Programmer, room thermostat and TRVs

Pass

Hot water controls

No cylinder

Boiler interlock

Yes

Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100 %

Minimum

75 %

Pass

8 Mechanical ventilation

Continuous extract system (decentralised)

Specific fan power

0.1900 0.1800

Maximum

0.7

Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Southern England)

Slight

Pass

Based on:

Overshading

Average

Windows facing North East

5.04 m², No overhang

Windows facing South East

5.69 m², No overhang

Air change rate

3.87 ach

Blinds/curtains

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

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type

U-value

Filled Cavity with Edge Sealing

0.00

W/m²K

Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.01 (design value) m³/(h.m²) @ 50 Pa

Maximum

10.0 m³/(h.m²) @ 50 Pa

Pass

10 Key features

Party wall U-value

0.00

W/m²K

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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	668 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	668	Prop Type Ref	Block B
Property	Plot 668		

SAP Rating	83 B	DER	18.94	TER	20.01
Environmental	88 B	% DER<TER	5.34		
CO ₂ Emissions (t/year)	0.78	DFEE	46.90	TFFEE	49.99
General Requirements Compliance	Pass	% DFEE<TFFEE	6.17		

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	50.6200 (1b)	x 2.5100 (2b)	= 127.0562 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.6200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 127.0562 (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				2	(19)									
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.8500 (20)									
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2129 (21)									
Wind speed	Jan 5.1000	Feb 4.7000	Mar 4.6000	Apr 4.3000	May 4.3000	Jun 4.0000	Jul 4.0000	Aug 3.9000	Sep 4.0000	Oct 4.5000	Nov 4.4000	Dec 4.7000	(22)	
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)	
Adj infilt rate	0.2715	0.2502	0.2449	0.2289	0.2289	0.2129	0.2129	0.2076	0.2129	0.2395	0.2342	0.2502	(22b)	
Mechanical extract ventilation - decentralised													0.5000	(23a)
If mechanical ventilation:														
Effective ac	0.5215	0.5002	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5002	(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)			10.7300	1.3258	14.2254		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Flr - Ground			50.6170	0.1400	7.0864	70.5600	3571.5355 (28a)
Wl - Brick	36.7190	10.7340	25.9850	0.2800	7.2758	104.1000	2705.0385 (29a)
Wl - To Corridor	3.9900	2.1170	1.8730	0.2499	0.4681	106.6200	199.6993 (29a)
Total net area of external elements Aum(A, m ²)			91.3250				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		31.5996		(33)
Party Wall			32.7340	0.0000	0.0000	54.0300	1768.6180 (32)
Party Ceiling			50.6170			70.0000	3543.1900 (32b)
Ground Floor Stud			99.5617			5.8200	579.4489 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		12367.5302 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							244.3210 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							8.6219 (36)
Total fabric heat loss					(33) + (36) =		40.2215 (37)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	21.8649	20.9721	20.9643	20.9643	20.9643	20.9643	20.9643	20.9643	20.9643	20.9643	20.9643	20.9721 (38)
Average = Sum(39)m / 12 =	62.0864	61.1936	61.1858	61.1858	61.1858	61.1858	61.1858	61.1858	61.1858	61.1858	61.1858	61.1936 (39)
												61.2621 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.2265	1.2089	1.2087	1.2087	1.2087	1.2087	1.2087	1.2087	1.2087	1.2087	1.2087	1.2089 (40)
Days in month												1.2102 (40)
	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												
Average daily hot water use (litres/day)												1.7084 (42)
Daily hot water use												74.7737 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy content (annual)	82.2511	79.2601	76.2692	73.2782	70.2873	67.2963	67.2963	70.2873	73.2782	76.2692	79.2601	82.2511 (44)
Distribution loss (46)m = 0.15 x (45)m	121.9760	106.6810	110.0852	95.9749	92.0902	79.4669	73.6377	84.5004	85.5096	99.6532	108.7792	118.1272 (45)
Water storage loss:	Total = Sum(45)m = 1176.4816 (45)											
Total storage loss	18.2964	16.0021	16.5128	14.3962	13.8135	11.9200	11.0457	12.6751	12.8264	14.9480	16.3169	17.7191 (46)
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 (56)
Combi 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 (57)
Total heat required for water heating calculated for each month	14.5179	13.0947	14.4688	13.9693	14.4111	13.9187	14.3656	14.3951	13.9463	14.4449	14.0170	14.5084 (61)
Solar input	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356 (62)
Output from w/h	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)
	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356 (64)
RHI water heating demand	Total per year (kWh/year) = Sum(64)m = 1347 (64)											
Heat gains from water heating, kWh/month	44.1865	38.7451	40.2205	35.4040	34.2228	29.9024	28.0759	31.6952	31.9185	36.7459	39.6733	42.9044 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	33.2434	29.5265	24.0126	18.1791	13.5891	11.4725	12.3964	16.1133	21.6272	27.4608	32.0508	34.1674 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	222.1554	224.4607	218.6514	206.2843	190.6730	176.0005	166.1985	163.8932	169.7024	182.0696	197.6809	212.3533 (68)
Pumps, fans	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586 (69)
Losses e.g. evaporation (negative values) (Table 5)	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)
Water heating gains (Table 5)	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347 (71)
Total internal gains	59.3904	57.6564	54.0598	49.1722	45.9984	41.5311	37.7365	42.6010	44.3313	49.3897	55.1019	57.6672 (72)
	398.9151	395.7695	380.8498	357.7615	334.3863	313.1300	300.4572	306.7334	319.7868	343.0459	368.9594	388.3138 (73)

6. Solar gains

[Jan]	Area	Solar flux	Specific data	Specific data	Access	Gains						
	m2	Table 6a	g	FF	factor	W						
		W/m2	or Table 6b	or Table 6c	Table 6d							
Northeast	5.0400	15.0428	0.5000	0.0000	0.7700	29.1891 (75)						
Southeast	5.6940	46.3896	0.5000	0.0000	0.7700	101.6948 (77)						
Solar gains	130.8839	199.0727	293.5951	409.1220	471.2185	522.0419	484.8716	428.1616	350.6456	239.1851	157.1341	105.8375 (83)
Total gains	529.7991	594.8421	674.4448	766.8834	805.6048	835.1719	785.3289	734.8950	670.4324	582.2310	526.0935	494.1513 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
util living area	55.3330	56.1403	56.1475	56.1475	56.1475	56.1475	56.1475	56.1475	56.1475	56.1475	56.1475	56.1403 (85)
MIT	4.6889	4.7427	4.7432	4.7432	4.7432	4.7432	4.7432	4.7432	4.7432	4.7432	4.7432	4.7427
MIT 2	0.9723	0.9542	0.9023	0.7846	0.6083	0.4067	0.2877	0.3073	0.5329	0.8117	0.9417	0.9777 (86)
Th 2	20.1554	20.3110	20.5707	20.8209	20.9554	20.9944	20.9992	20.9989	20.9816	20.8312	20.4850	20.1303 (87)
util rest of house	19.8988	19.9129	19.9130	19.9130	19.9130	19.9130	19.9130	19.9130	19.9130	19.9130	19.9130	19.9129 (88)
MIT 2	0.9640	0.9412	0.8765	0.7370	0.5397	0.3295	0.2035	0.2174	0.4428	0.7542	0.9220	0.9708 (89)
	19.1733	19.3338	19.5756	19.7900	19.8894	19.9112	19.9129	19.9129	19.9061	19.8060	19.5031	19.1611 (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) =	0.4417 (91)		
MIT	19.6071	19.7655	20.0151	20.2454	20.3602	20.3897	20.3927	20.3926	20.3811	20.2589	19.9368	19.5892 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.4571	19.6155	19.8651	20.0954	20.2102	20.2397	20.2427	20.2426	20.2311	20.1089	19.7868	19.4392 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9598	0.9370	0.8752	0.7456	0.5591	0.3529	0.2291	0.2448	0.4698	0.7656	0.9193	0.9670	(94)
Useful gains	508.5102	557.3538	590.2970	571.7601	450.3911	294.7193	179.9249	179.8721	314.9826	445.7578	483.6396	477.8316	(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	872.7565	851.5375	768.8079	642.1683	465.6385	296.1207	180.0533	180.0444	320.0713	508.3836	696.7113	852.9927	(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	270.9992	197.6915	132.8121	50.6939	11.3441	0.0000	0.0000	0.0000	0.0000	46.5936	153.4117	279.1198	(98)
RHI space heating demand												1142.6658	(98)
												1143	(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	50.6200 (1b)	x 2.5100 (2b)	= 127.0562 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.6200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 127.0562 (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				2	(19)
Shelter factor				(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor				(21) = (18) x (20) =	0.2129 (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	0.2715	0.2662	0.2608	0.2342	0.2289	0.2023	0.2023	0.1970	0.2129	0.2289	0.2395	0.2502 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												0.5000 (23a)
Effective ac	0.5215	0.5162	0.5108	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5002 (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)			10.7300	1.3258	14.2254		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Flr - Ground			50.6170	0.1400	7.0864	70.5600	3571.5355 (28a)
Wl - Brick	36.7190	10.7340	25.9850	0.2800	7.2758	104.1000	2705.0385 (29a)
Wl - To Corridor	3.9900	2.1170	1.8730	0.2499	0.4681	106.6200	199.6993 (29a)
Total net area of external elements Aum(A, m2)			91.3250				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	31.5996		(33)
Party Wall			32.7340	0.0000	0.0000	54.0300	1768.6180 (32)
Party Ceiling			50.6170			70.0000	3543.1900 (32b)
Ground Floor Stud			99.5617			5.8200	579.4489 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	12367.5302 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							244.3210 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							8.6219 (36)
Total fabric heat loss						(33) + (36) =	40.2215 (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	21.8649	21.6417	21.4185	20.9643	20.9643	20.9643	20.9643	20.9643	20.9643	20.9643	20.9643	20.9721 (38)
Heat transfer coeff	62.0864	61.8632	61.6400	61.1858	61.1858	61.1858	61.1858	61.1858	61.1858	61.1858	61.1858	61.1936 (39)
Average = Sum(39)m / 12 =												61.3558 (39)
HLP	1.2265	1.2221	1.2177	1.2087	1.2087	1.2087	1.2087	1.2087	1.2087	1.2087	1.2087	1.2089 (40)
HLP (average)												1.2121 (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												1.7084 (42)
Average daily hot water use (litres/day)												74.7737 (43)
Daily hot water use	82.2511	79.2601	76.2692	73.2782	70.2873	67.2963	67.2963	70.2873	73.2782	76.2692	79.2601	82.2511 (44)
Energy conte	121.9760	106.6810	110.0852	95.9749	92.0902	79.4669	73.6377	84.5004	85.5096	99.6532	108.7792	118.1272 (45)
Energy content (annual)										Total = Sum(45)m =		1176.4816 (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	18.2964	16.0021	16.5128	14.3962	13.8135	11.9200	11.0457	12.6751	12.8264	14.9480	16.3169	17.7191 (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	14.5179	13.0947	14.4688	13.9693	14.4111	13.9187	14.3656	14.3951	13.9463	14.4449	14.0170	14.5084 (61)
Total heat required for water heating calculated for each month	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356 (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	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356 (64)
Heat gains from water heating, kWh/month	44.1865	38.7451	40.2205	35.4040	34.2228	29.9024	28.0759	31.6952	31.9185	36.7459	39.6733	42.9044 (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	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	33.2434	29.5265	24.0126	18.1791	13.5891	11.4725	12.3964	16.1133	21.6272	27.4608	32.0508	34.1674 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	222.1554	224.4607	218.6514	206.2843	190.6730	176.0005	166.1985	163.8932	169.7024	182.0696	197.6809	212.3533 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586 (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)	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347 (71)
Water heating gains (Table 5)	59.3904	57.6564	54.0598	49.1722	45.9984	41.5311	37.7365	42.6010	44.3313	49.3897	55.1019	57.6672 (72)
Total internal gains	398.9151	395.7695	380.8498	357.7615	334.3863	313.1300	300.4572	306.7334	319.7868	343.0459	368.9594	388.3138 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Northeast	5.0400	11.2829	0.5000	0.0000	0.7700	21.8934 (75)						
Southeast	5.6940	36.7938	0.5000	0.0000	0.7700	80.6591 (77)						
Solar gains	102.5525	181.9569	268.2774	364.7854	438.1419	447.9723	426.4836	369.7691	301.3855	206.3093	124.1586	86.9066 (83)
Total gains	501.4676	577.7264	649.1272	722.5468	772.5282	761.1024	726.9408	676.5025	621.1723	549.3552	493.1180	475.2204 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	55.3330	55.5326	55.7337	56.1475	56.1475	56.1475	56.1475	56.1475	56.1475	56.1475	56.1475	56.1403
alpha	4.6889	4.7022	4.7156	4.7432	4.7432	4.7432	4.7432	4.7432	4.7432	4.7432	4.7432	4.7427
util living area	0.9826	0.9660	0.9278	0.8358	0.6816	0.5036	0.3682	0.4122	0.6405	0.8806	0.9669	0.9860 (86)
MIT	19.9864	20.1836	20.4561	20.7450	20.9206	20.9845	20.9971	20.9952	20.9546	20.7149	20.3016	19.9544 (87)
Th 2	19.8988	19.9024	19.9059	19.9130	19.9130	19.9130	19.9130	19.9130	19.9130	19.9130	19.9130	19.9129 (88)
util rest of house	0.9774	0.9564	0.9082	0.7959	0.6182	0.4228	0.2784	0.3168	0.5545	0.8406	0.9558	0.9818 (89)
MIT 2	19.0078	19.2023	19.4640	19.7284	19.8664	19.9068	19.9124	19.9118	19.8920	19.7112	19.3287	18.9879 (90)
Living area fraction	19.4401	19.6358	19.9022	20.1774	20.3320	20.3828	20.3915	20.3904	20.3614	20.1545	19.7584	19.4148 (92)
Temperature adjustment	19.2901	19.4858	19.7522	20.0274	20.1820	20.2328	20.2415	20.2404	20.2114	20.0045	19.6084	-0.1500
adjusted MIT												19.2648 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	488.3468	550.0082	587.4575	578.3665	490.2407	340.2018	222.2439	233.9562	359.7572	463.9054	469.4155	465.0546 (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	930.6809	902.3212	816.8682	680.8410	518.9805	344.6497	222.8108	234.9758	373.9282	575.4221	765.3388	921.8715 (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	329.0965	236.7543	170.6816	73.7816	21.3824	0.0000	0.0000	0.0000	0.0000	82.9685	213.0647	339.8717 (98)
Space heating per m2												1467.6014 (98)
												(98) / (4) = 28.9925 (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													1621.6590 (211)
Space heating requirement	329.0965	236.7543	170.6816	73.7816	21.3824	0.0000	0.0000	0.0000	0.0000	82.9685	213.0647	339.8717	(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)	363.6426	261.6070	188.5984	81.5267	23.6270	0.0000	0.0000	0.0000	0.0000	91.6779	235.4306	375.5488	(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	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356	(64)
Efficiency of water heater (217)m	89.5378	89.3991	89.1218	88.5575	87.8192	87.3000	87.3000	87.3000	87.3000	88.6193	89.3032	89.5783	(217)
Fuel for water heating, kWh/month	152.4427	133.9786	139.7570	124.1501	121.2734	106.9709	100.8056	113.2823	113.9243	128.7509	137.5048	148.0667	(219)
Water heating fuel used													1520.9074 (219)
Annual totals kWh/year													
Space heating fuel - main system													1621.6590 (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)													37.5195 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													112.5195 (231)
Electricity for lighting (calculated in Appendix L)													234.8357 (232)
Total delivered energy for all uses													3489.9216 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1621.6590	3.4800	56.4337	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1520.9074	3.4800	52.9276	(247)
Mechanical ventilation fans	37.5195	13.1900	4.9488	(249)
Pumps and fans for heating	75.0000	13.1900	9.8925	(249)
Energy for lighting	234.8357	13.1900	30.9748	(250)
Additional standing charges			120.0000	(251)
Total energy cost			275.1775	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200	(256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.2087	(257)
SAP value		83.1388	
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	1621.6590	0.2160	350.2783	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1520.9074	0.2160	328.5160	(264)
Space and water heating			678.7943	(265)
Pumps and fans	112.5195	0.5190	58.3976	(267)
Energy for lighting	234.8357	0.5190	121.8797	(268)
Total kg/year			859.0717	(272)
CO2 emissions per m2			16.9700	(273)
EI value			87.9611	
EI rating			88	(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	$3.48 / 0.8843 = 3.935$, stars = 4
Water heating environmental impact	$0.216 / 0.8843 = 0.2443$, 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	50.6200 (1b)	x 2.5100 (2b)	= 127.0562 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.6200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 127.0562 (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				2	(19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.8500 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2129 (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	0.2715	0.2502	0.2449	0.2289	0.2289	0.2129	0.2129	0.2076	0.2129	0.2395	0.2342	0.2502 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5215	0.5002	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5002 (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)			10.7300	1.3258	14.2254		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Flr - Ground			50.6170	0.1400	7.0864	70.5600	3571.5355 (28a)
Wl - Brick	36.7190	10.7340	25.9850	0.2800	7.2758	104.1000	2705.0385 (29a)
Wl - To Corridor	3.9900	2.1170	1.8730	0.2499	0.4681	106.6200	199.6993 (29a)
Total net area of external elements Aum(A, m2)			91.3250				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	31.5996		(33)
Party Wall			32.7340	0.0000	0.0000	54.0300	1768.6180 (32)
Party Ceiling			50.6170			70.0000	3543.1900 (32b)
Ground Floor Stud			99.5617			5.8200	579.4489 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	12367.5302 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							244.3210 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							8.6219 (36)
Total fabric heat loss						(33) + (36) =	40.2215 (37)

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

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	21.8649	20.9721	20.9643	20.9643	20.9643	20.9643	20.9643	20.9643	20.9643	20.9643	20.9643	20.9721 (38)
Heat transfer coeff	62.0864	61.1936	61.1858	61.1858	61.1858	61.1858	61.1858	61.1858	61.1858	61.1858	61.1858	61.1936 (39)
Average = Sum(39)m / 12 =												61.2621 (39)
HLP	1.2265	1.2089	1.2087	1.2087	1.2087	1.2087	1.2087	1.2087	1.2087	1.2087	1.2087	1.2089 (40)
HLP (average)												1.2102 (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												1.7084 (42)
Average daily hot water use (litres/day)												74.7737 (43)
Daily hot water use	82.2511	79.2601	76.2692	73.2782	70.2873	67.2963	67.2963	70.2873	73.2782	76.2692	79.2601	82.2511 (44)
Energy conte	121.9760	106.6810	110.0852	95.9749	92.0902	79.4669	73.6377	84.5004	85.5096	99.6532	108.7792	118.1272 (45)
Energy content (annual)										Total = Sum(45)m =		1176.4816 (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	18.2964	16.0021	16.5128	14.3962	13.8135	11.9200	11.0457	12.6751	12.8264	14.9480	16.3169	17.7191 (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	14.5179	13.0947	14.4688	13.9693	14.4111	13.9187	14.3656	14.3951	13.9463	14.4449	14.0170	14.5084 (61)
Total heat required for water heating calculated for each month	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356 (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	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356 (64)
Heat gains from water heating, kWh/month	44.1865	38.7451	40.2205	35.4040	34.2228	29.9024	28.0759	31.6952	31.9185	36.7459	39.6733	42.9044 (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	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	33.2434	29.5265	24.0126	18.1791	13.5891	11.4725	12.3964	16.1133	21.6272	27.4608	32.0508	34.1674 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	222.1554	224.4607	218.6514	206.2843	190.6730	176.0005	166.1985	163.8932	169.7024	182.0696	197.6809	212.3533 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586 (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)	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347 (71)
Water heating gains (Table 5)	59.3904	57.6564	54.0598	49.1722	45.9984	41.5311	37.7365	42.6010	44.3313	49.3897	55.1019	57.6672 (72)
Total internal gains	398.9151	395.7695	380.8498	357.7615	334.3863	313.1300	300.4572	306.7334	319.7868	343.0459	368.9594	388.3138 (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						
Northeast	5.0400	15.0428	0.5000	0.0000	0.7700	29.1891 (75)						
Southeast	5.6940	46.3896	0.5000	0.0000	0.7700	101.6948 (77)						
Solar gains	130.8839	199.0727	293.5951	409.1220	471.2185	522.0419	484.8716	428.1616	350.6456	239.1851	157.1341	105.8375 (83)
Total gains	529.7991	594.8421	674.4448	766.8834	805.6048	835.1719	785.3289	734.8950	670.4324	582.2310	526.0935	494.1513 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, T _{hl} (C)												
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	55.3330	56.1403	56.1475	56.1475	56.1475	56.1475	56.1475	56.1475	56.1475	56.1475	56.1475	56.1403
alpha	4.6889	4.7427	4.7432	4.7432	4.7432	4.7432	4.7432	4.7432	4.7432	4.7432	4.7432	4.7427
util living area	0.9723	0.9542	0.9023	0.7846	0.6083	0.4067	0.2877	0.3073	0.5329	0.8117	0.9417	0.9777 (86)
MIT	20.1554	20.3110	20.5707	20.8209	20.9554	20.9944	20.9992	20.9989	20.9816	20.8312	20.4850	20.1303 (87)
Th 2	19.8988	19.9129	19.9130	19.9130	19.9130	19.9130	19.9130	19.9130	19.9130	19.9130	19.9130	19.9129 (88)
util rest of house	0.9640	0.9412	0.8765	0.7370	0.5397	0.3295	0.2035	0.2174	0.4428	0.7542	0.9220	0.9708 (89)
MIT 2	19.1733	19.3338	19.5756	19.7900	19.8894	19.9112	19.9129	19.9129	19.9061	19.8060	19.5031	19.1611 (90)
Living area fraction	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000 (91)
Living area fraction	19.6071	19.7655	20.0151	20.2454	20.3602	20.3897	20.3927	20.3926	20.3811	20.2589	19.9368	19.5892 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.4571	19.6155	19.8651	20.0954	20.2102	20.2397	20.2427	20.2426	20.2311	20.1089	19.7868	19.4392 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	508.5102	557.3538	590.2970	571.7601	450.3911	294.7193	179.9249	179.8721	314.9826	445.7578	483.6396	477.8316 (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	872.7565	851.5375	768.8079	642.1683	465.6385	296.1207	180.0533	180.0444	320.0713	508.3836	696.7113	852.9927 (97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000 (97a)
Space heating kWh	270.9992	197.6915	132.8121	50.6939	11.3441	0.0000	0.0000	0.0000	0.0000	46.5936	153.4117	279.1198 (98)
Space heating per m ²												1142.6658 (98)
										(98) / (4) =		22.5734 (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													1262.6142 (211)
Space heating requirement	270.9992	197.6915	132.8121	50.6939	11.3441	0.0000	0.0000	0.0000	0.0000	46.5936	153.4117	279.1198	(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)	299.4466	218.4436	146.7537	56.0154	12.5349	0.0000	0.0000	0.0000	0.0000	51.4846	169.5157	308.4197	(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	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356	(64)
Efficiency of water heater (217)m	89.4023	89.2655	88.9226	88.2851	87.5982	87.3000	87.3000	87.3000	87.3000	88.2043	89.0488	89.4439	(216)
Fuel for water heating, kWh/month	152.6737	134.1792	140.0702	124.5331	121.5794	106.9709	100.8056	113.2823	113.9243	129.3566	137.8976	148.2892	(219)
Water heating fuel used													1523.5621 (219)
Annual totals kWh/year													
Space heating fuel - main system													1262.6142 (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)													37.5195 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													112.5195 (231)
Electricity for lighting (calculated in Appendix L)													234.8357 (232)
Total delivered energy for all uses													3133.5315 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1262.6142	3.8700	48.8632 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1523.5621	3.8700	58.9619 (247)
Mechanical ventilation fans	37.5195	18.9000	7.0912 (249)
Pumps and fans for heating	75.0000	18.9000	14.1750 (249)
Energy for lighting	234.8357	18.9000	44.3840 (250)
Additional standing charges			93.0000 (251)
Total energy cost			266.4752 (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	1262.6142	0.2160	272.7247 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1523.5621	0.2160	329.0894 (264)
Space and water heating			601.8141 (265)
Pumps and fans	112.5195	0.5190	58.3976 (267)
Energy for lighting	234.8357	0.5190	121.8797 (268)
Total kg/year			782.0914 (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	1262.6142	1.2200	1540.3893 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1523.5621	1.2200	1858.7458 (264)
Space and water heating			3399.1351 (265)
Pumps and fans	112.5195	3.0700	345.4347 (267)
Energy for lighting	234.8357	3.0700	720.9457 (268)
Primary energy kWh/year			4465.5155 (272)
Primary energy kWh/m2/year			88.2164 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 83
Current environmental impact rating: B 88

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 83
 Potential environmental impact rating: B 88

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	£66	£66	£0
Mains gas	£201	£201	£0
Space heating	£163	£163	£0
Water heating	£59	£59	£0
Lighting	£44	£44	£0
Total cost of fuels	£267	£267	£0
Total cost of uses	£266	£266	£0
Delivered energy	62 kWh/m ²	62 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	0.8 tonnes	0.8 tonnes	0.0 tonnes
CO2 emissions per m ²	15 kg/m ²	15 kg/m ²	0 kg/m ²
Primary energy	88 kWh/m ²	88 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	668 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	668	Prop Type Ref	Block B
Property	Plot 668		

SAP Rating	83 B	DER	18.94	TER	20.01
Environmental	88 B	% DER<TER	5.34		
CO₂ Emissions (t/year)	0.78	DFEE	46.90	TFEE	49.99
General Requirements Compliance	Pass	% DFEE<TFEE	6.17		

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

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	20.01	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	18.94	kgCO ₂ /m ²	Pass
	-1.07 (-5.3%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	49.99	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	46.90	kWh/m ² /yr	
	-3.1 (-6.2%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.28 (max. 0.30)	0.28 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.14 (max. 0.25)	0.14 (max. 0.70)	Pass
Openings	1.37 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.01 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

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

Calculation Type: New Build (As Designed)



Secondary heating system

None

5 Cylinder insulation

Hot water storage

No cylinder

6 Controls

Space heating controls

Programmer, room thermostat and TRVs

Pass

Hot water controls

No cylinder

Boiler interlock

Yes

Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100

%

Minimum

75

%

Pass

8 Mechanical ventilation

Continuous extract system (decentralised)

Specific fan power

0.1900 0.1800

Maximum

0.7

Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Southern England)

Slight

Pass

Based on:

Overshading

Average

Windows facing North East

5.04 m², No overhang

Windows facing South East

5.69 m², No overhang

Air change rate

3.87 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.