

PREDICTED ENERGY ASSESSMENT

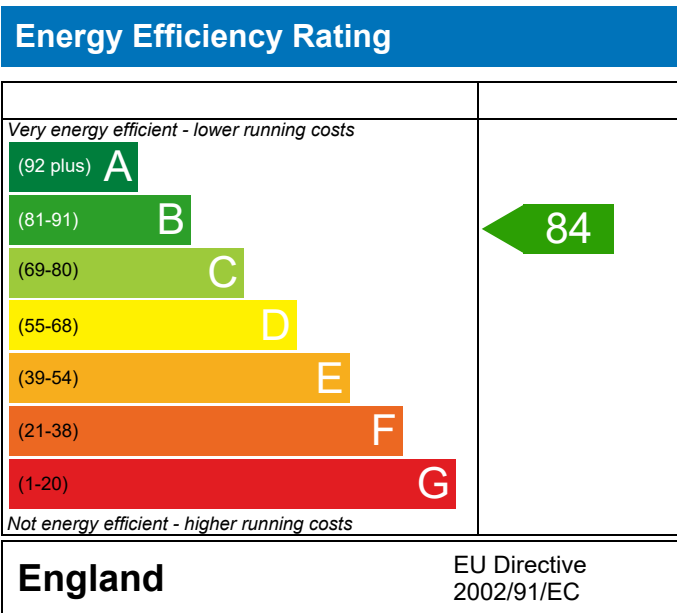


Plot 684

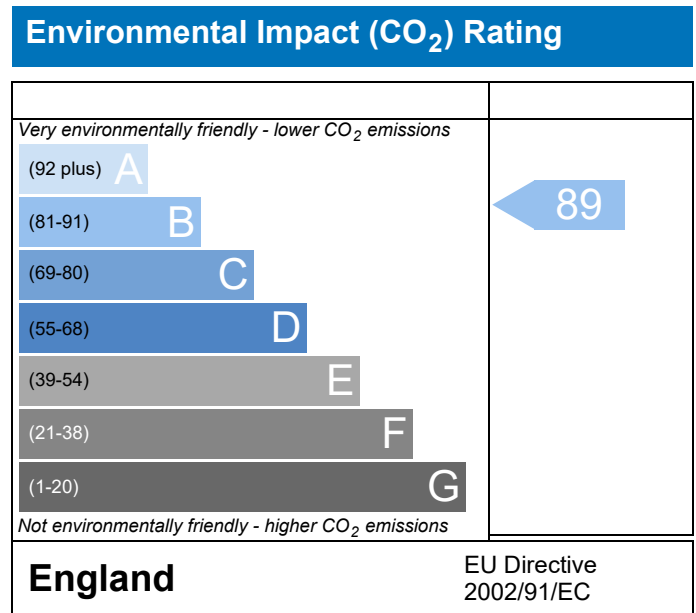
Dwelling type: Flat, Mid-Terrace
 Date of assessment: 26/02/2021
 Produced by: Michael Juckes
 Total floor area: 50.62 m²

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.



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	684 - PRJ009149		Issued on Date	26/02/2021	
Assessment Reference	684	Prop Type Ref	Block B		
Property	Plot 684				
SAP Rating	84 B	DER	16.90	TER	18.55
Environmental	89 B	% DER<TER	8.92		
CO ₂ Emissions (t/year)	0.71	DFEE	38.28	TFEE	42.46
General Requirements Compliance	Pass	% DFEE<TFEE	9.83		
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)	18.55	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	16.90	kgCO ₂ /m ²	Pass
	-1.65 (-8.9%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	42.46	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	38.28	kWh/m ² /yr	
	-4.2 (-9.9%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.25 (max. 0.30)	0.25 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	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

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)



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

4.85 m², No overhang

Windows facing North West

5.60 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

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

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	684 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	684	Prop Type Ref	Block B
Property	Plot 684		

SAP Rating	84 B	DER	16.90	TER	18.55
Environmental	89 B	% DER<TER	8.92		
CO ₂ Emissions (t/year)	0.71	DFEE	38.28	TTEE	42.46
General Requirements Compliance	Pass	% DFEE<TTEE	9.83		

Assessor Details	Mr. Michael Juckes, Michael Juckes, Tel: 02033971373, michael@briaryenergy.co.uk	Assessor ID	T850-0001
------------------	--	-------------	-----------

Client	
--------	--

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 2.4600 (2b)	= 124.5252 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.6200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 124.5252 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour								
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)								
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)								
Number of intermittent fans				0 * 10 =	0.0000 (7a)								
Number of passive vents				0 * 10 =	0.0000 (7b)								
Number of flueless gas fires				0 * 40 =	0.0000 (7c)								
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				Air changes per hour	0.0000 / (5) = 0.0000 (8)								
Pressure test				Yes									
Measured/design AP50				5.0100									
Infiltration rate				0.2505	(18)								
Number of sides sheltered				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)			10.4500	1.3258	13.8542		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
W1 - Clad	35.9900	10.4490	25.5410	0.2500	6.3853	61.0100	1558.2564 (29a)
W1 - To Corridor	3.9100	2.1170	1.7930	0.2499	0.4481	106.6200	191.1697 (29a)
Total net area of external elements Aum(A, m ²)			39.9040				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	23.2315		(33)
Party Wall			32.0820	0.0000	0.0000	54.0300	1733.3905 (32)
Party Floor			50.6170			40.0000	2024.6800 (32d)
Party Ceiling			50.6170			70.0000	3543.1900 (32b)
1st Floor Stud			97.5784			5.8200	567.9061 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	9618.5926 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							190.0157 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.5486 (36)
Total fabric heat loss						(33) + (36) =	27.7801 (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	21.4293	20.5543	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5543 (38)
Average = Sum(39)m / 12 =	49.2095	48.3345	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3345 (39)
HLP	0.9721	0.9548	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9548 (40)
HLP (average)												0.9562 (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													1.7084 (42)
Average daily hot water use (litres/day)													74.7737 (43)
Daily hot water use	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:	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)	
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)	
RHI water heating demand	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)	
Heat gains from water heating, kWh/month												1347 (64)	
												1347 (64)	

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	33.3087	29.5845	24.0597	18.2148	13.6158	11.4950	12.4207	16.1450	21.6697	27.5147	32.1137	34.2345 (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)
	398.9804	395.8275	380.8969	357.7972	334.4130	313.1526	300.4816	306.7650	319.8293	343.0998	369.0223	388.3809 (73)

6. Solar gains

[Jan]	Area	Solar flux	Specific data	Specific data	Access	Gains						
	m ²	Table 6a	g	FF	factor	W						
		W/m ²	or Table 6b	or Table 6c	Table 6d							
Northeast	4.8500	15.0428	0.5000	0.0000	0.7700	28.0887 (75)						
Northwest	5.5990	15.0428	0.5000	0.0000	0.7700	32.4266 (81)						
Solar gains	60.5153	105.9907	190.6686	317.8296	405.7062	466.5342	426.6257	349.2316	246.2131	137.3025	75.6182	47.0759 (83)
Total gains	459.4957	501.8182	571.5655	675.6267	740.1191	779.6868	727.1073	655.9966	566.0424	480.4023	444.6405	435.4568 (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)													
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
alpha	54.2951	55.2780	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2780	
util living area	4.6197	4.6852	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6852	
MIT	0.9603	0.9413	0.8788	0.7312	0.5331	0.3455	0.2457	0.2721	0.5011	0.7908	0.9257	0.9655 (86)	
Th 2	20.2215	20.3602	20.6174	20.8637	20.9728	20.9970	20.9995	20.9993	20.9849	20.8450	20.5275	20.2127 (87)	
util rest of house	20.1066	20.1211	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1211 (88)	
MIT 2	0.9514	0.9290	0.8557	0.6912	0.4820	0.2920	0.1875	0.2077	0.4321	0.7439	0.9075	0.9576 (89)	
	19.4233	19.5683	19.8086	20.0220	20.1052	20.1200	20.1212	20.1211	20.1143	20.0141	19.7311	19.4274 (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	19.7759	19.9181	20.1659	20.3938	20.4884	20.5074	20.5092	20.5090	20.4989	20.3811	20.0829	19.7743 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.6259	19.7681	20.0159	20.2438	20.3384	20.3574	20.3592	20.3590	20.3489	20.2311	19.9329	19.6243 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9458	0.9232	0.8526	0.6971	0.4949	0.3064	0.2032	0.2252	0.4503	0.7502	0.9030	0.9522 (94)
Useful gains	434.5798	463.2998	487.3141	470.9563	366.2619	238.9167	147.7719	147.7260	254.8831	360.4135	401.5078	414.6604 (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	700.0476	679.9743	614.5173	514.3804	373.9724	239.5762	147.8394	147.8323	258.4934	407.4491	557.3472	682.6893 (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	197.5080	145.6052	94.6392	31.2654	5.7367	0.0000	0.0000	0.0000	0.0000	34.9945	112.2043	199.4135 (98)
RHI space heating demand												821.3669 (98)
												821 (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 2.4600 (2b)	= 124.5252 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.6200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 124.5252 (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)			10.4500	1.3258	13.8542		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Clad	35.9900	10.4490	25.5410	0.2500	6.3853	61.0100	1558.2564 (29a)
Wl - To Corridor	3.9100	2.1170	1.7930	0.2499	0.4481	106.6200	191.1697 (29a)
Total net area of external elements Aum(A, m2)			39.9040				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	23.2315		(33)
Party Wall			32.0820	0.0000	0.0000	54.0300	1733.3905 (32)
Party Floor			50.6170			40.0000	2024.6800 (32d)
Party Ceiling			50.6170			70.0000	3543.1900 (32b)
1st Floor Stud			97.5784			5.8200	567.9061 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	9618.5926 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							190.0157 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.5486 (36)
Total fabric heat loss						(33) + (36) =	27.7801 (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	21.4293	21.2106	20.9918	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5543 (38)
Heat transfer coeff	49.2095	48.9907	48.7720	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3345 (39)
Average = Sum(39)m / 12 =												48.4934 (39)
HLP	0.9721	0.9678	0.9635	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9548 (40)
HLP (average)												0.9580 (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	33.3087	29.5845	24.0597	18.2148	13.6158	11.4950	12.4207	16.1450	21.6697	27.5147	32.1137	34.2345 (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	398.9804	395.8275	380.8969	357.7972	334.4130	313.1526	300.4816	306.7650	319.8293	343.0998	369.0223	388.3809 (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	4.8500	11.2829	0.5000	0.0000	0.7700	21.0681 (75)						
Northwest	5.5990	11.2829	0.5000	0.0000	0.7700	24.3217 (81)						
Solar gains	45.3897	92.3921	166.4613	273.3772	367.4726	391.7647	366.4878	292.1684	202.8357	112.9105	57.1121	37.0676 (83)
Total gains	444.3702	488.2196	547.3582	631.1744	701.8856	704.9173	666.9694	598.9334	522.6649	456.0103	426.1344	425.4484 (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	54.2951	54.5375	54.7821	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867
alpha	4.6197	4.6358	4.6521	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858
util living area	0.9723	0.9558	0.9103	0.7912	0.6094	0.4335	0.3178	0.3689	0.6075	0.8617	0.9531	0.9764 (86)
MIT	20.0705	20.2310	20.5007	20.7956	20.9479	20.9912	20.9984	20.9968	20.9618	20.7374	20.3640	20.0502 (87)
Th 2	20.1066	20.1102	20.1139	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1211 (88)
util rest of house	0.9663	0.9465	0.8924	0.7564	0.5600	0.3760	0.2548	0.2995	0.5403	0.8278	0.9417	0.9712 (89)
MIT 2	19.2756	19.4345	19.6944	19.9659	20.0879	20.1171	20.1208	20.1202	20.1007	19.9234	19.5753	19.2678 (90)
Living area fraction	19.6267	19.7863	20.0505	20.3324	20.4678	20.5032	20.5084	20.5074	20.4811	20.2829	19.9237	19.6134 (92)
Temperature adjustment	19.4767	19.6363	19.9005	20.1824	20.3178	20.3532	20.3584	20.3574	20.3311	20.1329	19.7737	-0.1500
adjusted MIT												19.4634 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9611	0.9407	0.8875	0.7590	0.5713	0.3913	0.2719	0.3183	0.5569	0.8283	0.9363	0.9664 (94)
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	746.8375	721.9430	653.5703	545.2433	416.4705	278.0321	181.6320	191.2480	301.1274	460.6959	612.4783	737.7486 (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	237.8962	176.5321	124.8374	47.6596	11.5109	0.0000	0.0000	0.0000	0.0000	61.7361	153.7081	242.9795 (98)
Space heating												1056.8598 (98)
Space heating per m2												(98) / (4) = 20.8783 (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													1167.8009 (211)
Space heating requirement	237.8962	176.5321	124.8374	47.6596	11.5109	0.0000	0.0000	0.0000	0.0000	61.7361	153.7081	242.9795	(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)	262.8687	195.0631	137.9418	52.6625	12.7193	0.0000	0.0000	0.0000	0.0000	68.2167	169.8432	268.4856	(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	89.3065	89.1786	88.8730	88.2436	87.6021	87.3000	87.3000	87.3000	87.3000	88.3974	89.0504	89.3436	(217)
Fuel for water heating, kWh/month	152.8375	134.3099	140.1483	124.5918	121.5739	106.9709	100.8056	113.2823	113.9243	129.0740	137.8952	148.4557	(219)
Water heating fuel used													1523.8693 (219)
Annual totals kWh/year													
Space heating fuel - main system													1167.8009 (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)													36.7721 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													111.7721 (231)
Electricity for lighting (calculated in Appendix L)													235.2969 (232)
Total delivered energy for all uses													3038.7392 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1167.8009	3.4800	40.6395 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1523.8693	3.4800	53.0307 (247)
Mechanical ventilation fans	36.7721	13.1900	4.8502 (249)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	235.2969	13.1900	31.0357 (250)
Additional standing charges			120.0000 (251)
Total energy cost			259.4485 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.1396 (257)
SAP value		84.1026
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	1167.8009	0.2160	252.2450 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1523.8693	0.2160	329.1558 (264)
Space and water heating			581.4008 (265)
Pumps and fans	111.7721	0.5190	58.0097 (267)
Energy for lighting	235.2969	0.5190	122.1191 (268)
Total kg/year			761.5296 (272)
CO2 emissions per m2			15.0400 (273)
EI value			89.3281
EI rating			89 (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	$3.48 / 0.8827 = 3.943$, stars = 4
Water heating environmental impact	$0.216 / 0.8827 = 0.2447$, 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 2.4600 (2b)	= 124.5252 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.6200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 124.5252 (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)
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:												0.5000 (23a)
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)			10.4500	1.3258	13.8542		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Clad	35.9900	10.4490	25.5410	0.2500	6.3853	61.0100	1558.2564 (29a)
Wl - To Corridor	3.9100	2.1170	1.7930	0.2499	0.4481	106.6200	191.1697 (29a)
Total net area of external elements Aum(A, m2)			39.9040				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	23.2315		(33)
Party Wall			32.0820	0.0000	0.0000	54.0300	1733.3905 (32)
Party Floor			50.6170			40.0000	2024.6800 (32d)
Party Ceiling			50.6170			70.0000	3543.1900 (32b)
1st Floor Stud			97.5784			5.8200	567.9061 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	9618.5926 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							190.0157 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.5486 (36)
Total fabric heat loss						(33) + (36) =	27.7801 (37)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	21.4293	20.5543	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5543 (38)
Heat transfer coeff	49.2095	48.3345	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3345 (39)
Average = Sum(39)m / 12 =												48.4016 (39)
HLP	0.9721	0.9548	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9548 (40)
HLP (average)												0.9562 (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	33.3087	29.5845	24.0597	18.2148	13.6158	11.4950	12.4207	16.1450	21.6697	27.5147	32.1137	34.2345 (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	398.9804	395.8275	380.8969	357.7972	334.4130	313.1526	300.4816	306.7650	319.8293	343.0998	369.0223	388.3809 (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	4.8500	15.0428	0.5000	0.0000	0.7700	28.0887 (75)
Northwest	5.5990	15.0428	0.5000	0.0000	0.7700	32.4266 (81)
Solar gains	60.5153	105.9907	190.6686	317.8296	405.7062	466.5342
Total gains	459.4957	501.8182	571.5655	675.6267	740.1191	779.6868

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	54.2951	55.2780	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867
alpha	4.6197	4.6852	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6852
util living area	0.9603	0.9413	0.8788	0.7312	0.5331	0.3455	0.2457	0.2721	0.5011	0.7908	0.9257	0.9655 (86)
MIT	20.2215	20.3602	20.6174	20.8637	20.9728	20.9970	20.9995	20.9993	20.9849	20.8450	20.5275	20.2127 (87)
Th 2	20.1066	20.1211	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1211 (88)
util rest of house	0.9514	0.9290	0.8557	0.6912	0.4820	0.2920	0.1875	0.2077	0.4321	0.7439	0.9075	0.9576 (89)
MIT 2	19.4233	19.5683	19.8086	20.0220	20.1052	20.1200	20.1212	20.1211	20.1143	20.0141	19.7311	19.4274 (90)
Living area fraction	19.7759	19.9181	20.1659	20.3938	20.4884	20.5074	20.5092	20.5090	20.4989	20.3811	20.0829	19.7743 (91)
Temperature adjustment	19.6259	19.7681	20.0159	20.2438	20.3384	20.3574	20.3592	20.3590	20.3489	20.2311	19.9329	-0.1500 (92)
adjusted MIT												19.6243 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	434.5798	463.2998	487.3141	470.9563	366.2619	238.9167	147.7719	147.7260	254.8831	360.4135	401.5078	414.6604 (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	700.0476	679.9743	614.5173	514.3804	373.9724	239.5762	147.8394	147.8323	258.4934	407.4491	557.3472	682.6893 (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	197.5080	145.6052	94.6392	31.2654	5.7367	0.0000	0.0000	0.0000	0.0000	34.9945	112.2043	199.4135 (98)
Space heating per m2												821.3669 (98)
												(98) / (4) = 16.2261 (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													907.5877 (211)
Space heating requirement	197.5080	145.6052	94.6392	31.2654	5.7367	0.0000	0.0000	0.0000	0.0000	34.9945	112.2043	199.4135	(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)	218.2409	160.8898	104.5737	34.5474	6.3389	0.0000	0.0000	0.0000	0.0000	38.6680	123.9827	220.3464	(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	89.1644	89.0272	88.6534	87.9889	87.4581	87.3000	87.3000	87.3000	87.3000	88.0306	88.7992	89.1940	(216)
Fuel for water heating, kWh/month	153.0812	134.5384	140.4954	124.9524	121.7742	106.9709	100.8056	113.2823	113.9243	129.6119	138.2853	148.7046	(219)
Water heating fuel used													1526.4265 (219)
Annual totals kWh/year													
Space heating fuel - main system													907.5877 (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)													36.7721 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													111.7721 (231)
Electricity for lighting (calculated in Appendix L)													235.2969 (232)
Total delivered energy for all uses													2781.0832 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	907.5877	3.8700	35.1236 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1526.4265	3.8700	59.0727 (247)
Mechanical ventilation fans	36.7721	18.9000	6.9499 (249)
Pumps and fans for heating	75.0000	18.9000	14.1750 (249)
Energy for lighting	235.2969	18.9000	44.4711 (250)
Additional standing charges			93.0000 (251)
Total energy cost			252.7924 (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	907.5877	0.2160	196.0389 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1526.4265	0.2160	329.7081 (264)
Space and water heating			525.7471 (265)
Pumps and fans	111.7721	0.5190	58.0097 (267)
Energy for lighting	235.2969	0.5190	122.1191 (268)
Total kg/year			705.8759 (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	907.5877	1.2200	1107.2570 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1526.4265	1.2200	1862.2403 (264)
Space and water heating			2969.4973 (265)
Pumps and fans	111.7721	3.0700	343.1402 (267)
Energy for lighting	235.2969	3.0700	722.3615 (268)
Primary energy kWh/year			4034.9991 (272)
Primary energy kWh/m2/year			79.7116 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 84
Current environmental impact rating: B 89

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

(For testing purposes):

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

Recommended measures: (none)	SAP change	Cost change	CO2 change
---------------------------------	------------	-------------	------------

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 89

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	£187	£187	£0
Space heating	£149	£149	£0
Water heating	£59	£59	£0
Lighting	£44	£44	£0
Total cost of fuels	£253	£253	£0
Total cost of uses	£252	£252	£0
Delivered energy	55 kWh/m ²	55 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	0.7 tonnes	0.7 tonnes	0.0 tonnes
CO2 emissions per m ²	14 kg/m ²	14 kg/m ²	0 kg/m ²
Primary energy	80 kWh/m ²	80 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	684 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	684	Prop Type Ref	Block B
Property	Plot 684		

SAP Rating	84 B	DER	16.90	TER	18.55
Environmental	89 B	% DER<TER	8.92		
CO₂ Emissions (t/year)	0.71	DFEE	38.28	TFEE	42.46
General Requirements Compliance	Pass	% DFEE<TFEE	9.83		

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)	18.55	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	16.90	kgCO ₂ /m ²	Pass
	-1.65 (-8.9%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	42.46	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	38.28	kWh/m ² /yr	
	-4.2 (-9.9%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.25 (max. 0.30)	0.25 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	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
Secondary heating system	None	

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



5 Cylinder insulation

Hot water storage

6 Controls

Space heating controls

Hot water controls

Boiler interlock

7 Low energy lights

Percentage of fixed lights with low-energy fittings %

Minimum %

8 Mechanical ventilation

Continuous extract system (decentralised)

Specific fan power

Maximum

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Southern England)

Based on:

Overshading

Windows facing North East

Windows facing North West

Air change rate

Blinds/curtains

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type	U-value	W/m ² K	
Filled Cavity with Edge Sealing	<input type="text" value="0.00"/>	W/m ² K	<input type="text" value="Pass"/>

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

Maximum

10 Key features

Party wall U-value 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.