

PREDICTED ENERGY ASSESSMENT

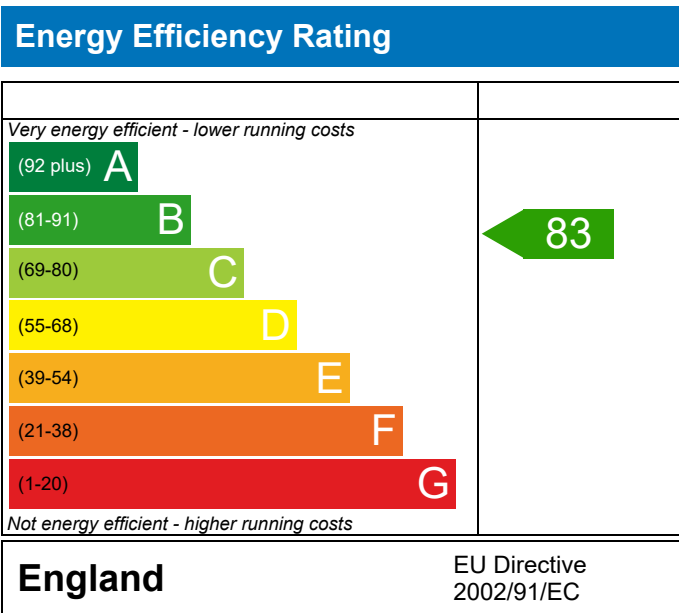


Plot 678

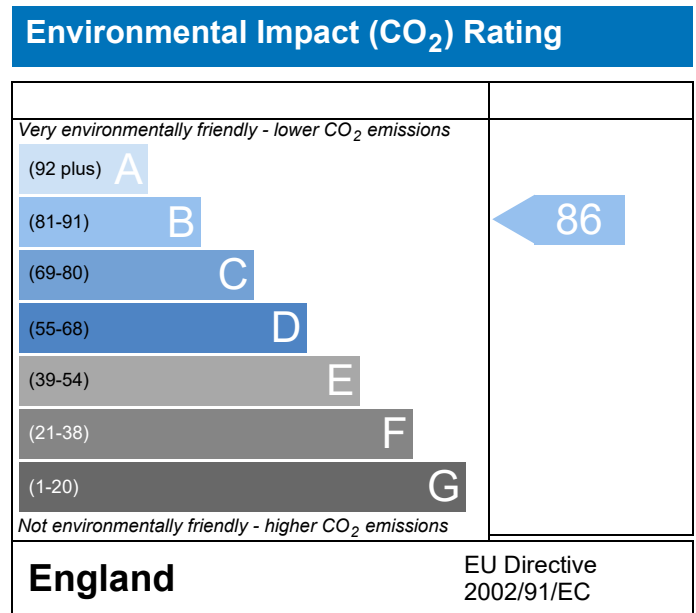
Dwelling type: Flat, Detached
 Date of assessment: 26/02/2021
 Produced by: Michael Juckes
 Total floor area: 67.16 m²

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	678 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	678	Prop Type Ref	Block B
Property	Plot 678		

SAP Rating	83 B	DER	19.87	TER	20.11
Environmental	86 B	% DER<TER	1.18		
CO ₂ Emissions (t/year)	1.08	DFEE	54.59	TFEE	57.77
General Requirements Compliance	Pass	% DFEE<TFEE	5.50		

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

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	20.11	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	19.87	kgCO ₂ /m ²	Pass
	-0.24 (-1.2%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	57.77	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	54.59	kWh/m ² /yr	
	-3.2 (-5.5%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.27 (max. 0.30)	0.28 (max. 0.70)	Pass
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	Pass
Openings	1.38 (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

Windows facing South West

5.71 m², No overhang

Air change rate

4.55 ach

Blinds/curtains

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

Criterion 4 – Building performance consistent with DER and DFEE rate

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

None

N/A

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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	678 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	678	Prop Type Ref	Block B
Property	Plot 678		

SAP Rating	83 B	DER	19.87	TER	20.11
Environmental	86 B	% DER<TER	1.18		
CO ₂ Emissions (t/year)	1.08	DFEE	54.59	TTEE	57.77
General Requirements Compliance	Pass	% DFEE<TTEE	5.50		

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	67.1600 (1b)	x 2.5100 (2b)	= 168.5716 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	67.1600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 168.5716 (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				0	(19)								
Shelter factor			(20) = 1 - [0.075 x (19)] =		1.0000 (20)								
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2505 (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 infiltr rate	0.3194	0.2943	0.2881	0.2693	0.2693	0.2505	0.2505	0.2442	0.2505	0.2818	0.2756	0.2943	(22b)
Mechanical extract ventilation - decentralised													
If mechanical ventilation:													0.5000 (23a)
Effective ac	0.5694	0.5443	0.5381	0.5193	0.5193	0.5005	0.5005	0.5000	0.5005	0.5318	0.5256	0.5443	(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)			16.4400	1.3258	21.7955		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Flr - Ground			67.1550	0.1600	10.7448	70.5600	4738.4568 (28a)
Wl - Brick GF	66.0200	16.4390	49.5810	0.2800	13.8827	104.1000	5161.3821 (29a)
Wl - To Corridor	27.9300	2.1170	25.8130	0.2499	6.4509	106.6200	2752.1821 (29a)
Total net area of external elements Aum(A, m ²)			161.1090				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	55.4179	(33)
Party Ceiling			67.1550			70.0000	4700.8500 (32b)
Ground Floor Stud			132.1465			5.8200	769.0925 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		18121.9635 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							269.8327 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							11.5133 (36)
Total fabric heat loss					(33) + (36) =		66.9312 (37)

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

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	31.6742	30.2807	29.9324	28.8873	28.8873	27.8421	27.8421	27.8143	27.8421	29.5840	29.2356	30.2807	(38)
Heat transfer coeff	98.6054	97.2119	96.8636	95.8185	95.8185	94.7733	94.7733	94.7455	94.7733	96.5152	96.1668	97.2119	(39)
Average = Sum(39)m / 12 =												96.1064	(39)
HLP	1.4682	1.4475	1.4423	1.4267	1.4267	1.4112	1.4112	1.4107	1.4112	1.4371	1.4319	1.4475	(40)
HLP (average)												1.4310	(40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Assumed occupancy													2.1753	(42)
Average daily hot water use (litres/day)													85.8622	(43)
Daily hot water use	94.4485	91.0140	87.5795	84.1450	80.7105	77.2760	77.2760	80.7105	84.1450	87.5795	91.0140	94.4485	(44)	
Energy conte	140.0643	122.5012	126.4102	110.2075	105.7467	91.2514	84.5578	97.0313	98.1902	114.4312	124.9106	135.6448	(45)	
Energy content (annual)													1350.9473	(45)
Distribution loss (46)m = 0.15 x (45)m	21.0096	18.3752	18.9615	16.5311	15.8620	13.6877	12.6837	14.5547	14.7285	17.1647	18.7366	20.3467	(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	14.6138	13.1756	14.5490	14.0365	14.4730	13.9698	14.4129	14.4519	14.0062	14.5176	14.0994	14.6013	(61)	
Total heat required for water heating calculated for each month	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461	(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)	
Solar input (sum of months) = Sum(63)m =													0.0000	(63)
Output from w/h	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461	(64)	
Total per year (kWh/year) = Sum(64)m =													1521.8541	(64)
RHI water heating demand													1522	(64)
Heat gains from water heating, kWh/month	50.2248	44.0255	45.6687	40.1531	38.7790	33.8335	31.7187	35.8759	36.1498	41.6778	45.0576	48.7522	(65)	

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	42.4759	37.7267	30.6814	23.2278	17.3631	14.6586	15.8392	20.5883	27.6336	35.0872	40.9520	43.6564	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	284.4478	287.3995	279.9614	264.1265	244.1378	225.3512	212.8006	209.8489	217.2870	233.1219	253.1107	271.8973	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	(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)	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	(71)
Water heating gains (Table 5)	67.5065	65.5142	61.3826	55.7682	52.1223	46.9910	42.6327	48.2203	50.2080	56.0185	62.5800	65.5272	(72)
Total internal gains	491.1620	487.3722	468.7572	439.8543	410.3550	383.7326	368.0042	375.3893	391.8605	420.9595	453.3745	477.8126	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b g	Specific data or Table 6c FF	Access factor Table 6d	Gains W							
Northeast	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)						
Southwest	5.7050	46.3896	0.5000	0.0000	0.7700	101.8913	(79)						
Solar gains	232.7752	347.3073	495.6120	665.4354	747.2799	819.6282	764.5026	688.3755	582.9800	412.4775	278.0274	189.1289	(83)
Total gains	723.9372	834.6795	964.3693	1105.2897	1157.6349	1203.3608	1132.5068	1063.7649	974.8404	833.4370	731.4019	666.9415	(84)

7. Mean internal temperature (heating season)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
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	51.0507	51.7825	51.9687	52.5356	52.5356	53.1149	53.1149	53.1305	53.1149	52.1563	52.3453	51.7825		
alpha	4.4034	4.4522	4.4646	4.5024	4.5024	4.5410	4.5410	4.5420	4.4771	4.4771	4.4897	4.4522		
util living area	0.9805	0.9650	0.9204	0.8134	0.6476	0.4350	0.3086	0.3281	0.5612	0.8423	0.9562	0.9850	(86)	
MIT	19.9663	20.1462	20.4493	20.7572	20.9306	20.9908	20.9985	20.9981	20.9728	20.7668	20.3569	19.9360	(87)	
Th 2	19.7114	19.7271	19.7311	19.7429	19.7429	19.7548	19.7548	19.7551	19.7548	19.7350	19.7390	19.7271	(88)	
util rest of house	0.9735	0.9532	0.8949	0.7621	0.5672	0.3412	0.2053	0.2185	0.4547	0.7813	0.9383	0.9795	(89)	
MIT 2	18.8299	19.0159	19.3036	19.5801	19.7080	19.7521	19.7546	19.7549	19.7455	19.5911	19.2317	18.8134	(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) =	0.2799 (91)	
MIT	19.1480	19.3323	19.6243	19.9096	20.0502	20.0989	20.1028	20.1029	20.0890	19.9202	19.5466	19.1276 (92)
Temperature adjustment												-0.1500
adjusted MIT	18.9980	19.1823	19.4743	19.7596	19.9002	19.9489	19.9528	19.9529	19.9390	19.7702	19.3966	18.9776 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9684	0.9467	0.8887	0.7628	0.5778	0.3561	0.2218	0.2360	0.4711	0.7832	0.9321	0.9751 (94)
Useful gains	701.0452	790.2248	857.0315	843.1262	668.9342	428.4880	251.2057	251.0752	459.2402	652.7731	681.7607	650.3215 (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	1340.8404	1310.6455	1179.2471	973.4773	699.4978	431.1123	251.4162	251.3490	468.0899	769.2501	1057.5115	1310.1883 (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	476.0076	349.7227	239.7284	93.8528	22.7393	0.0000	0.0000	0.0000	0.0000	86.6589	270.5405	490.9409 (98)
RHI space heating demand												2030.1912 (98)
												2030 (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 (m ²)	Storey height (m)	Volume (m ³)
Ground floor	67.1600 (1b)	2.5100 (2b)	168.5716 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	67.1600		168.5716 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 168.5716 (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	0.2505 (18)
Number of sides sheltered				0	0 (19)
Shelter factor				(20) = 1 - [0.075 x (19)] =	1.0000 (20)
Infiltration rate adjusted to include shelter factor				(21) = (18) x (20) =	0.2505 (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	0.3194	0.3131	0.3069	0.2756	0.2693	0.2380	0.2380	0.2317	0.2505	0.2693	0.2818	0.2943 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5694	0.5631	0.5569	0.5256	0.5193	0.5000	0.5000	0.5000	0.5005	0.5193	0.5318	0.5443 (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)			16.4400	1.3258	21.7955		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Flr - Ground			67.1550	0.1600	10.7448	70.5600	4738.4568 (28a)
Wl - Brick GF	66.0200	16.4390	49.5810	0.2800	13.8827	104.1000	5161.3821 (29a)
Wl - To Corridor	27.9300	2.1170	25.8130	0.2499	6.4509	106.6200	2752.1821 (29a)
Total net area of external elements Aum(A, m ²)			161.1090				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 55.4179		(33)
Party Ceiling			67.1550			70.0000	4700.8500 (32b)
Ground Floor Stud			132.1465			5.8200	769.0925 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 18121.9635 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							269.8327 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							11.5133 (36)
Total fabric heat loss							(33) + (36) = 66.9312 (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
Heat transfer coeff	31.6742	31.3259	30.9775	29.2356	28.8873	27.8143	27.8143	27.8143	27.8421	28.8873	29.5840	30.2807 (38)
Average = Sum(39)m / 12 =	98.6054	98.2571	97.9087	96.1668	95.8185	94.7455	94.7455	94.7455	94.7733	95.8185	96.5152	97.2119 (39)
HLP	1.4682	1.4630	1.4578	1.4319	1.4267	1.4107	1.4107	1.4107	1.4112	1.4267	1.4371	1.4475 (40)
HLP (average)												1.4335 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.1753 (42)
Average daily hot water use (litres/day)												85.8622 (43)
Daily hot water use	94.4485	91.0140	87.5795	84.1450	80.7105	77.2760	77.2760	80.7105	84.1450	87.5795	91.0140	94.4485 (44)
Energy conte	140.0643	122.5012	126.4102	110.2075	105.7467	91.2514	84.5578	97.0313	98.1902	114.4312	124.9106	135.6448 (45)
Energy content (annual)												Total = Sum(45)m = 1350.9473 (45)
Distribution loss (46)m = 0.15 x (45)m												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

Water storage loss:	21.0096	18.3752	18.9615	16.5311	15.8620	13.6877	12.6837	14.5547	14.7285	17.1647	18.7366	20.3467 (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	14.6138	13.1756	14.5490	14.0365	14.4730	13.9698	14.4129	14.4519	14.0062	14.5176	14.0994	14.6013 (61)
Total heat required for water heating calculated for each month	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461 (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	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461 (64)
Heat gains from water heating, kWh/month	50.2248	44.0255	45.6687	40.1531	38.7790	33.8335	31.7187	35.8759	36.1498	41.6778	45.0576	48.7522 (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	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	42.4759	37.7267	30.6814	23.2278	17.3631	14.6586	15.8392	20.5883	27.6336	35.0872	40.9520	43.6564 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	284.4478	287.3995	279.9614	264.1265	244.1378	225.3512	212.8006	209.8489	217.2870	233.1219	253.1107	271.8973 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268 (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)	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101 (71)
Water heating gains (Table 5)	67.5065	65.5142	61.3826	55.7682	52.1223	46.9910	42.6327	48.2203	50.2080	56.0185	62.5800	65.5272 (72)
Total internal gains	491.1620	487.3722	468.7572	439.8543	410.3550	383.7326	368.0042	375.3893	391.8605	420.9595	453.3745	477.8126 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data g or Table 6b	Specific data FF 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)						
Southwest	5.7050	36.7938	0.5000	0.0000	0.7700	80.8149 (79)						
Solar gains	183.3674	319.6146	456.6267	598.1592	699.5400	707.4802	676.6768	599.0549	505.3278	358.4503	220.9562	156.0673 (83)
Total gains	674.5294	806.9868	925.3839	1038.0135	1109.8950	1091.2128	1044.6811	974.4442	897.1883	779.4098	674.3307	633.8800 (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	51.0507	51.2317	51.4140	52.3453	52.5356	53.1305	53.1305	53.1305	53.1149	52.5356	52.1563	51.7825
alpha	4.4034	4.4154	4.4276	4.4897	4.5024	4.5420	4.5420	4.5420	4.5410	4.5024	4.4771	4.4522
util living area	0.9883	0.9742	0.9420	0.8612	0.7189	0.5379	0.3953	0.4408	0.6720	0.9028	0.9766	0.9909 (86)
MIT	19.7771	20.0062	20.3151	20.6616	20.8829	20.9755	20.9951	20.9921	20.9357	20.6321	20.1434	19.7416 (87)
Th 2	19.7114	19.7153	19.7193	19.7390	19.7429	19.7551	19.7551	19.7551	19.7548	19.7429	19.7350	19.7271 (88)
util rest of house	0.9842	0.9657	0.9230	0.8195	0.6469	0.4411	0.2855	0.3249	0.5727	0.8626	0.9672	0.9877 (89)
MIT 2	18.6436	18.8706	19.1691	19.4984	19.6768	19.7462	19.7542	19.7534	19.7270	19.4870	19.0236	18.6212 (90)
Living area fraction	18.9609	19.1885	19.4899	19.8240	20.0144	20.0903	20.1016	20.1002	20.0654	19.8075	19.3371	18.9348 (92)
Temperature adjustment	18.8109	19.0385	19.3399	19.6740	19.8644	19.9403	19.9516	19.9502	19.9154	19.6575	19.1871	-0.1500
adjusted MIT	18.8109	19.0385	19.3399	19.6740	19.8644	19.9403	19.9516	19.9502	19.9154	19.6575	19.1871	18.7848 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	661.3005	774.5429	847.7761	848.1453	726.3250	497.5821	316.5544	334.6003	526.2094	669.7626	648.5949	624.0273 (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	1430.8533	1389.2041	1257.1381	1036.1006	782.2986	505.9703	317.5452	336.3620	551.1417	867.8768	1166.5847	1417.8183 (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	572.5473	413.0524	304.5653	135.3278	41.6443	0.0000	0.0000	0.0000	0.0000	147.3970	372.9526	590.5805 (98)
Space heating												2578.0672 (98)
Space heating per m2												(98) / (4) = 38.3869 (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													2848.6931 (211)
Space heating requirement	572.5473	413.0524	304.5653	135.3278	41.6443	0.0000	0.0000	0.0000	0.0000	147.3970	372.9526	590.5805	(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)	632.6489	456.4115	336.5363	149.5334	46.0158	0.0000	0.0000	0.0000	0.0000	162.8696	412.1024	652.5751	(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	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461	(64)
Efficiency of water heater (217)m	89.7999	89.6871	89.4625	88.9396	88.1015	87.3000	87.3000	87.3000	87.3000	88.9781	89.6082	89.8322	(216)
Fuel for water heating, kWh/month	172.2476	151.2778	157.5624	139.6949	136.4559	120.5283	113.3686	127.7012	128.5182	144.9219	155.1309	167.2519	(219)
Water heating fuel used													1714.6596 (219)
Annual totals kWh/year													
Space heating fuel - main system													2848.6931 (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)													49.7789 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													124.7789 (231)
Electricity for lighting (calculated in Appendix L)													300.0549 (232)
Total delivered energy for all uses													4988.1865 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2848.6931	3.4800	99.1345	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1714.6596	3.4800	59.6702	(247)
Mechanical ventilation fans	49.7789	13.1900	6.5658	(249)
Pumps and fans for heating	75.0000	13.1900	9.8925	(249)
Energy for lighting	300.0549	13.1900	39.5772	(250)
Additional standing charges			120.0000	(251)
Total energy cost			334.8402	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.2539 (257)
SAP value		82.5087
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	2848.6931	0.2160	615.3177	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1714.6596	0.2160	370.3665	(264)
Space and water heating			985.6842	(265)
Pumps and fans	124.7789	0.5190	64.7602	(267)
Energy for lighting	300.0549	0.5190	155.7285	(268)
Total kg/year			1206.1729	(272)
CO2 emissions per m2			17.9600	(273)
EI value			85.5896	
EI rating			86 (274)	
EI band			B	

Calculation of stars for heating and DHW

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.9050 = 3.845$, stars = 4
Main heating environmental impact	$0.216 \times (1 + 0.29 \times 0.00) / 0.9050 = 0.2387$, stars = 4
Water heating energy efficiency	$3.48 / 0.8863 = 3.926$, stars = 4
Water heating environmental impact	$0.216 / 0.8863 = 0.2437$, 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 (m ²)	Storey height (m)	Volume (m ³)
Ground floor	67.1600 (1b)	x 2.5100 (2b)	= 168.5716 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	67.1600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 168.5716 (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				0	(19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		1.0000 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2505 (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	0.3194	0.2943	0.2881	0.2693	0.2693	0.2505	0.2505	0.2442	0.2505	0.2818	0.2756	0.2943 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5694	0.5443	0.5381	0.5193	0.5193	0.5005	0.5005	0.5000	0.5005	0.5318	0.5256	0.5443 (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)			16.4400	1.3258	21.7955		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Flr - Ground			67.1550	0.1600	10.7448	70.5600	4738.4568 (28a)
Wl - Brick GF	66.0200	16.4390	49.5810	0.2800	13.8827	104.1000	5161.3821 (29a)
Wl - To Corridor	27.9300	2.1170	25.8130	0.2499	6.4509	106.6200	2752.1821 (29a)
Total net area of external elements Aum(A, m ²)			161.1090				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	55.4179		(33)
Party Ceiling			67.1550			70.0000	4700.8500 (32b)
Ground Floor Stud			132.1465			5.8200	769.0925 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	18121.9635 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							269.8327 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							11.5133 (36)
Total fabric heat loss						(33) + (36) =	66.9312 (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
Heat transfer coeff	31.6742	30.2807	29.9324	28.8873	28.8873	27.8421	27.8421	27.8143	27.8421	29.5840	29.2356	30.2807 (38)
Average = Sum(39)m / 12 =	98.6054	97.2119	96.8636	95.8185	95.8185	94.7733	94.7733	94.7455	94.7733	96.5152	96.1668	97.2119 (39)
												96.1064 (39)
HLP	1.4682	1.4475	1.4423	1.4267	1.4267	1.4112	1.4112	1.4107	1.4112	1.4371	1.4319	1.4475 (40)
HLP (average)												1.4310 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.1753 (42)
Average daily hot water use (litres/day)												85.8622 (43)
Daily hot water use	94.4485	91.0140	87.5795	84.1450	80.7105	77.2760	77.2760	80.7105	84.1450	87.5795	91.0140	94.4485 (44)
Energy conte	140.0643	122.5012	126.4102	110.2075	105.7467	91.2514	84.5578	97.0313	98.1902	114.4312	124.9106	135.6448 (45)
Energy content (annual)												Total = Sum(45)m = 1350.9473 (45)
Distribution loss (46)m = 0.15 x (45)m												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

Water storage loss:	21.0096	18.3752	18.9615	16.5311	15.8620	13.6877	12.6837	14.5547	14.7285	17.1647	18.7366	20.3467 (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	14.6138	13.1756	14.5490	14.0365	14.4730	13.9698	14.4129	14.4519	14.0062	14.5176	14.0994	14.6013 (61)
Total heat required for water heating calculated for each month	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461 (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	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461 (64)
Heat gains from water heating, kWh/month	50.2248	44.0255	45.6687	40.1531	38.7790	33.8335	31.7187	35.8759	36.1498	41.6778	45.0576	48.7522 (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	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	42.4759	37.7267	30.6814	23.2278	17.3631	14.6586	15.8392	20.5883	27.6336	35.0872	40.9520	43.6564 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	284.4478	287.3995	279.9614	264.1265	244.1378	225.3512	212.8006	209.8489	217.2870	233.1219	253.1107	271.8973 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268 (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)	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101 (71)
Water heating gains (Table 5)	67.5065	65.5142	61.3826	55.7682	52.1223	46.9910	42.6327	48.2203	50.2080	56.0185	62.5800	65.5272 (72)
Total internal gains	491.1620	487.3722	468.7572	439.8543	410.3550	383.7326	368.0042	375.3893	391.8605	420.9595	453.3745	477.8126 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data g or Table 6b	Specific data FF 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)						
Southwest	5.7050	46.3896	0.5000	0.0000	0.7700	101.8913 (79)						
Solar gains	232.7752	347.3073	495.6120	665.4354	747.2799	819.6282	764.5026	688.3755	582.9800	412.4775	278.0274	189.1289 (83)
Total gains	723.9372	834.6795	964.3693	1105.2897	1157.6349	1203.3608	1132.5068	1063.7649	974.8404	833.4370	731.4019	666.9415 (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	51.0507	51.7825	51.9687	52.5356	52.5356	53.1149	53.1149	53.1305	53.1149	52.1563	52.3453	51.7825
alpha	4.4034	4.4522	4.4646	4.5024	4.5024	4.5410	4.5410	4.5420	4.5410	4.4771	4.4897	4.4522
util living area	0.9805	0.9650	0.9204	0.8134	0.6476	0.4350	0.3086	0.3281	0.5612	0.8423	0.9562	0.9850 (86)
MIT	19.9663	20.1462	20.4493	20.7572	20.9306	20.9908	20.9985	20.9981	20.9728	20.7668	20.3569	19.9360 (87)
Th 2	19.7114	19.7271	19.7311	19.7429	19.7429	19.7548	19.7548	19.7551	19.7548	19.7350	19.7390	19.7271 (88)
util rest of house	0.9735	0.9532	0.8949	0.7621	0.5672	0.3412	0.2053	0.2185	0.4547	0.7813	0.9383	0.9795 (89)
MIT 2	18.8299	19.0159	19.3036	19.5801	19.7080	19.7521	19.7546	19.7549	19.7455	19.5911	19.2317	18.8134 (90)
Living area fraction	0.9735	0.9532	0.8949	0.7621	0.5672	0.3412	0.2053	0.2185	0.4547	0.7813	0.9383	0.9795 (91)
MIT	19.1480	19.3323	19.6243	19.9096	20.0502	20.0989	20.1028	20.1029	20.0890	19.9202	19.5466	19.1276 (92)
Temperature adjustment	18.9980	19.1823	19.4743	19.7596	19.9002	19.9489	19.9528	19.9529	19.9390	19.7702	19.3966	-0.1500
adjusted MIT	18.9980	19.1823	19.4743	19.7596	19.9002	19.9489	19.9528	19.9529	19.9390	19.7702	19.3966	18.9776 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9684	0.9467	0.8887	0.7628	0.5778	0.3561	0.2218	0.2360	0.4711	0.7832	0.9321	0.9751 (94)
Ext temp.	701.0452	790.2248	857.0315	843.1262	668.9342	428.4880	251.2057	251.0752	459.2402	652.7731	681.7607	650.3215 (95)
Heat loss rate W	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000 (96)
Month fracti	1340.8404	1310.6455	1179.2471	973.4773	699.4978	431.1123	251.4162	251.3490	468.0899	769.2501	1057.5115	1310.1883 (97)
Space heating kWh	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 per m2	476.0076	349.7227	239.7284	93.8528	22.7393	0.0000	0.0000	0.0000	0.0000	86.6589	270.5405	490.9409 (98)
												2030.1912 (98)
												30.2292 (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													2243.3052 (211)
Space heating requirement	476.0076	349.7227	239.7284	93.8528	22.7393	0.0000	0.0000	0.0000	0.0000	86.6589	270.5405	490.9409	(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)	525.9753	386.4340	264.8933	103.7048	25.1263	0.0000	0.0000	0.0000	0.0000	95.7556	298.9398	542.4761	(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	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461	(64)
Efficiency of water heater (217)m	89.6937	89.5822	89.2881	88.6489	87.7938	87.3000	87.3000	87.3000	87.3000	88.5586	89.3879	89.7293	(216)
Fuel for water heating, kWh/month	172.4515	151.4551	157.8701	140.1529	136.9342	120.5283	113.3686	127.7012	128.5182	145.6084	155.5132	167.4437	(219)
Water heating fuel used													1717.5454 (219)
Annual totals kWh/year													
Space heating fuel - main system													2243.3052 (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)													49.7789 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													124.7789 (231)
Electricity for lighting (calculated in Appendix L)													300.0549 (232)
Total delivered energy for all uses													4385.6845 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2243.3052	3.8700	86.8159 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1717.5454	3.8700	66.4690 (247)
Mechanical ventilation fans	49.7789	18.9000	9.4082 (249)
Pumps and fans for heating	75.0000	18.9000	14.1750 (249)
Energy for lighting	300.0549	18.9000	56.7104 (250)
Additional standing charges			93.0000 (251)
Total energy cost			326.5785 (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	2243.3052	0.2160	484.5539 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1717.5454	0.2160	370.9898 (264)
Space and water heating			855.5437 (265)
Pumps and fans	124.7789	0.5190	64.7602 (267)
Energy for lighting	300.0549	0.5190	155.7285 (268)
Total kg/year			1076.0325 (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	2243.3052	1.2200	2736.8324 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1717.5454	1.2200	2095.4054 (264)
Space and water heating			4832.2378 (265)
Pumps and fans	124.7789	3.0700	383.0711 (267)
Energy for lighting	300.0549	3.0700	921.1686 (268)
Primary energy kWh/year			6136.4775 (272)
Primary energy kWh/m2/year			91.3710 (273)

SAP 2012 EPC IMPROVEMENTS

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

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

(For testing purposes):

A	Not considered
B	Not considered
C	Not considered
D	Not considered
E	Low energy lighting
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 86

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

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

	Current	Potential	Saving
Electricity	£80	£80	£0
Mains gas	£246	£246	£0
Space heating	£203	£203	£0
Water heating	£66	£66	£0
Lighting	£57	£57	£0
Total cost of fuels	£326	£326	£0
Total cost of uses	£326	£326	£0
Delivered energy	65 kWh/m ²	65 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	1.1 tonnes	1.1 tonnes	0.0 tonnes
CO2 emissions per m ²	16 kg/m ²	16 kg/m ²	0 kg/m ²
Primary energy	91 kWh/m ²	91 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	678 - PRJ009149	Issued on Date	26/02/2021	
Assessment Reference	678	Prop Type Ref	Block B	
Property	Plot 678			
SAP Rating	83 B	DER	19.87	
Environmental	86 B	TER	20.11	
CO₂ Emissions (t/year)	1.08	% DER<TER	1.18	
General Requirements Compliance	Pass	DFEE	54.59	
		TFEE	57.77	
		% DFEE<TFEE	5.50	
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)	20.11	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	19.87	kgCO ₂ /m ²	Pass
	-0.24 (-1.2%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	57.77	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	54.59	kWh/m ² /yr	
	-3.2 (-5.5%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.27 (max. 0.30)	0.28 (max. 0.70)	Pass
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	Pass
Openings	1.38 (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 South East

Windows facing South West

Air change rate

Blinds/curtains

Criterion 4 – Building performance consistent with DER and DFEE rate

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

Maximum

10 Key features

None

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