

PREDICTED ENERGY ASSESSMENT

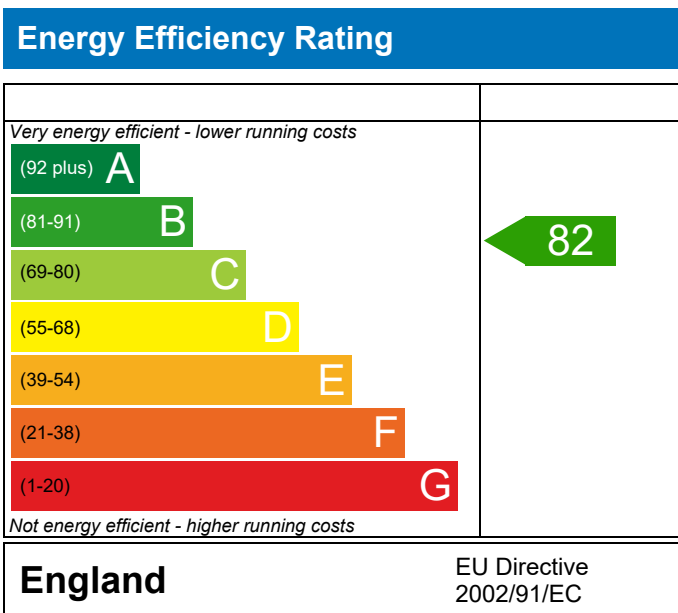


Plot 666

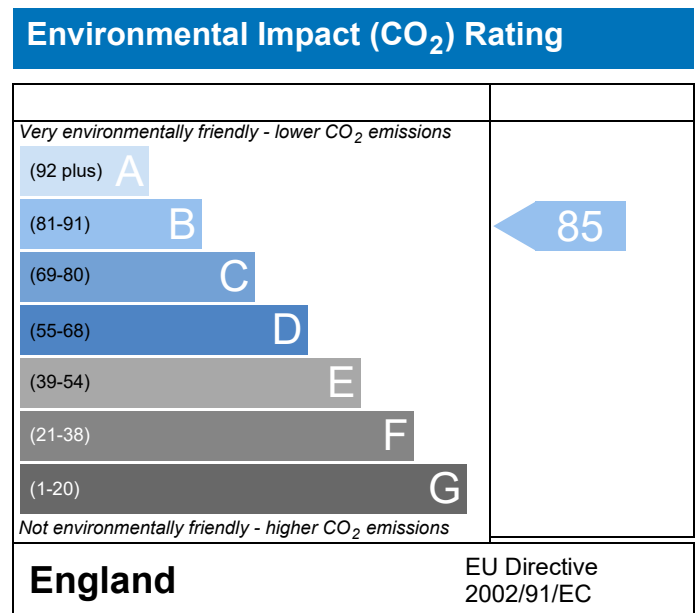
Dwelling type: Flat, Detached
 Date of assessment: 26/02/2021
 Produced by: Michael Juckes
 Total floor area: 67.16 m²

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	666 - PRJ009149		Issued on Date	26/02/2021	
Assessment Reference	666	Prop Type Ref	Block B		
Property	Plot 666				
SAP Rating	82 B	DER	20.71	TER	20.81
Environmental	85 B	% DER<TER	0.47		
CO ₂ Emissions (t/year)	1.12	DFEE	58.30	TFEE	61.28
General Requirements Compliance	Pass	% DFEE<TFEE	4.87		
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)	20.81	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	20.71	kgCO ₂ /m ²	Pass
	-0.10 (-0.5%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	61.28	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	58.30	kWh/m ² /yr	
	-3.0 (-4.9%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.27 (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	4.71 (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 West

5.71 m², No overhang

Windows facing North West

5.69 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

4.71 (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	666 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	666	Prop Type Ref	Block B
Property	Plot 666		

SAP Rating	82 B	DER	20.71	TER	20.81
Environmental	85 B	% DER<TER	0.47		
CO ₂ Emissions (t/year)	1.12	DFEE	58.30	TTEE	61.28
General Requirements Compliance	Pass	% DFEE<TTEE	4.87		

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				4.7100									
Infiltration rate				0.2355	(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) =		0.2355 (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	0.3003	0.2767	0.2708	0.2532	0.2532	0.2355	0.2355	0.2296	0.2355	0.2649	0.2591	0.2767	(22b)
Mechanical extract ventilation - decentralised													0.5000 (23a)
If mechanical ventilation:													
Effective ac	0.5503	0.5267	0.5208	0.5032	0.5032	0.5000	0.5000	0.5000	0.5000	0.5149	0.5091	0.5267	(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) =
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							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	30.6103	29.3003	28.9728	27.9902	27.9902	27.8143	27.8143	27.8143	27.8143	28.6453	28.3178	29.3003	(38)
Heat transfer coeff	97.5415	96.2315	95.9040	94.9214	94.9214	94.7455	94.7455	94.7455	94.7455	95.5765	95.2490	96.2315	(39)
Average = Sum(39)m / 12 =												95.4632	(39)
HLP	1.4524	1.4329	1.4280	1.4134	1.4134	1.4107	1.4107	1.4107	1.4107	1.4231	1.4182	1.4329	(40)
HLP (average)												1.4214	(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 Specific data or Table 6c	Access factor Table 6d	Gains W						
Northeast	5.0400	15.0428	0.5000	0.5000	0.0000	0.7700	29.1891	(75)					
Southwest	5.7050	46.3896	0.5000	0.5000	0.0000	0.7700	101.8913	(79)					
Northwest	5.6940	15.0428	0.5000	0.5000	0.0000	0.7700	32.9768	(81)					
Solar gains	164.0571	257.1163	397.8861	582.8119	692.8333	776.8453	717.8930	618.9710	485.2631	314.3398	198.5740	131.6513	(83)
Total gains	655.2192	744.4885	866.6433	1022.6662	1103.1883	1160.5780	1085.8972	994.3603	877.1235	735.2993	651.9485	609.4639	(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	51.6075	52.3101	52.4887	53.0321	53.0321	53.1305	53.1305	53.1305	53.1305	52.6686	52.8497	52.3101		
alpha	4.4405	4.4873	4.4992	4.5355	4.5355	4.5420	4.5420	4.5420	4.5420	4.5112	4.5233	4.4873		
util living area	0.9864	0.9763	0.9417	0.8417	0.6677	0.4500	0.3215	0.3505	0.6131	0.8834	0.9701	0.9893	(86)	
MIT	19.9049	20.0643	20.3748	20.7213	20.9235	20.9895	20.9982	20.9975	20.9614	20.7112	20.2858	19.8847	(87)	
Th 2	19.7234	19.7382	19.7419	19.7531	19.7531	19.7551	19.7551	19.7551	19.7551	19.7457	19.7494	19.7382	(88)	
util rest of house	0.9813	0.9678	0.9216	0.7942	0.5874	0.3534	0.2141	0.2337	0.5012	0.8315	0.9571	0.9852	(89)	
MIT 2	18.7799	18.9471	19.2464	19.5623	19.7141	19.7520	19.7549	19.7548	19.7414	19.5596	19.1744	18.7722	(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	19.0948	19.2598	19.5623	19.8868	20.0526	20.0984	20.1029	20.1027	20.0829	19.8820	19.4855	19.0836 (92)
Temperature adjustment												-0.1500
adjusted MIT	18.9448	19.1098	19.4123	19.7368	19.9026	19.9484	19.9529	19.9527	19.9329	19.7320	19.3355	18.9336 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9771	0.9623	0.9151	0.7935	0.5976	0.3687	0.2312	0.2524	0.5181	0.8308	0.9514	0.9816 (94)
Useful gains	640.2197	716.4277	793.0388	811.5041	659.2751	427.9214	251.1035	250.9640	454.4628	610.9076	620.2749	598.2513 (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	1321.1837	1290.4468	1161.6130	962.1966	693.1754	430.9443	251.3544	251.3279	467.3688	758.1098	1041.5957	1292.7368 (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	506.6372	385.7408	274.2192	108.4986	25.2219	0.0000	0.0000	0.0000	0.0000	109.5184	303.3509	516.6972 (98)
RHI space heating demand												2229.8842 (98)
												2230 (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	67.1600 (1b)	2.5100 (2b)	168.5716 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	67.1600		168.5716 (5)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)

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				4.7100	
Infiltration rate				0.2355	(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) =	0.2355 (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	0.3003	0.2944	0.2885	0.2591	0.2532	0.2237	0.2237	0.2178	0.2355	0.2532	0.2649	0.2767 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5503	0.5444	0.5385	0.5091	0.5032	0.5000	0.5000	0.5000	0.5000	0.5032	0.5149	0.5267 (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)			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, m2)			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/m2K							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	30.6103	30.2828	29.9553	28.3178	27.9902	27.8143	27.8143	27.8143	27.8143	27.9902	28.6453	29.3003 (38)
Average = Sum(39)m / 12 =	97.5415	97.2140	96.8865	95.2490	94.9214	94.7455	94.7455	94.7455	94.7455	94.9214	95.5765	96.2315 (39)
												95.6270 (39)
HLP	1.4524	1.4475	1.4426	1.4182	1.4134	1.4107	1.4107	1.4107	1.4107	1.4134	1.4231	1.4329 (40)
HLP (average)												1.4239 (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 =
Distribution loss (46)m = 0.15 x (45)m												1350.9473 (45)

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 or Table 6b g	Specific data or Table 6c FF	Access factor Table 6d	Gains W						
Northeast	5.0400	11.2829	0.5000	0.0000	0.7700	21.8934 (75)						
Southwest	5.7050	36.7938	0.5000	0.0000	0.7700	80.8149 (79)						
Northwest	5.6940	11.2829	0.5000	0.0000	0.7700	24.7344 (81)						
Solar gains	127.4427	232.5698	359.3508	514.2075	638.8937	661.9580	626.6772	529.4232	412.3104	268.1312	155.4674	107.2393 (83)
Total gains	618.6047	719.9420	828.1080	954.0618	1049.2486	1045.6907	994.6814	904.8125	804.1709	689.0907	608.8419	585.0519 (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	51.6075	51.7814	51.9564	52.8497	53.0321	53.1305	53.1305	53.1305	53.1305	53.0321	52.6686	52.3101
alpha	4.4405	4.4521	4.4638	4.5233	4.5355	4.5420	4.5420	4.5420	4.5420	4.5355	4.5112	4.4873
util living area	0.9915	0.9827	0.9589	0.8869	0.7423	0.5583	0.4144	0.4725	0.7260	0.9315	0.9837	0.9933 (86)
MIT	19.7295	19.9262	20.2347	20.6146	20.8692	20.9716	20.9941	20.9895	20.9119	20.5653	20.0829	19.7004 (87)
Th 2	19.7234	19.7271	19.7308	19.7494	19.7531	19.7551	19.7551	19.7551	19.7551	19.7531	19.7457	19.7382 (88)
util rest of house	0.9885	0.9767	0.9446	0.8501	0.6717	0.4591	0.2996	0.3493	0.6270	0.9000	0.9770	0.9909 (89)
MIT 2	18.6063	18.8028	19.1047	19.4696	19.6780	19.7446	19.7540	19.7529	19.7153	19.4400	18.9741	18.5892 (90)
Living area fraction	18.9207	19.1173	19.4210	19.7901	20.0114	20.0881	20.1011	20.0990	20.0503	19.7550	19.2845	18.9003 (92)
Temperature adjustment	18.7707	18.9673	19.2710	19.6401	19.8614	19.9381	19.9511	19.9490	19.9003	19.6050	19.1345	-0.1500
adjusted MIT												18.7503 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	609.5896	699.7367	776.7745	807.4162	711.7447	495.9456	316.2933	333.8881	514.4174	616.9261	592.0878	578.2097 (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	1411.4984	1367.5383	1237.3387	1022.9864	774.6939	505.7603	317.5038	336.2546	549.5490	854.7680	1150.2126	1400.1927 (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	596.6201	448.7626	342.6598	155.2106	46.8342	0.0000	0.0000	0.0000	0.0000	176.9543	401.8499	611.5553 (98)
Space heating												2780.4469 (98)
Space heating per m2												(98) / (4) = 41.4003 (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													3072.3170 (211)
Space heating requirement	596.6201	448.7626	342.6598	155.2106	46.8342	0.0000	0.0000	0.0000	0.0000	176.9543	401.8499	611.5553	(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)	659.2488	495.8703	378.6296	171.5034	51.7505	0.0000	0.0000	0.0000	0.0000	195.5296	444.0330	675.7517	(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	89.8221	89.7364	89.5433	89.0488	88.1741	87.3000	87.3000	87.3000	87.3000	89.1229	89.6554	89.8504	(216)
Fuel for water heating, kWh/month	172.2049	151.1948	157.4202	139.5235	136.3436	120.5283	113.3686	127.7012	128.5182	144.6864	155.0493	167.2180	(219)
Water heating fuel used													1713.7568 (219)
Annual totals kWh/year													
Space heating fuel - main system													3072.3170 (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													5210.9075 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3072.3170	3.4800	106.9166	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1713.7568	3.4800	59.6387	(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			342.5909	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200	(256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.2829	(257)
SAP value		82.1038	
SAP rating (Section 12)		82	(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	3072.3170	0.2160	663.6205	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1713.7568	0.2160	370.1715	(264)
Space and water heating			1033.7919	(265)
Pumps and fans	124.7789	0.5190	64.7602	(267)
Energy for lighting	300.0549	0.5190	155.7285	(268)
Total kg/year			1254.2807	(272)
CO2 emissions per m2			18.6800	(273)
EI value			85.0148	
EI rating			85	(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	$3.48 / 0.8868 = 3.924$, stars = 4
Water heating environmental impact	$0.216 / 0.8868 = 0.2436$, 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)
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				4.7100	
Infiltration rate				0.2355	(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) =		0.2355 (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				0.2532	0.2532	0.2355	0.2355	0.2296	0.2355	0.2649	0.2591	0.2767 (22b)
Mechanical extract ventilation - decentralised	0.3003	0.2767	0.2708									
If mechanical ventilation:												0.5000 (23a)
Effective ac	0.5503	0.5267	0.5208	0.5032	0.5032	0.5000	0.5000	0.5000	0.5000	0.5149	0.5091	0.5267 (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	30.6103	29.3003	28.9728	27.9902	27.9902	27.8143	27.8143	27.8143	27.8143	28.6453	28.3178	29.3003 (38)
Average = Sum(39)m / 12 =	97.5415	96.2315	95.9040	94.9214	94.9214	94.7455	94.7455	94.7455	94.7455	95.5765	95.2490	96.2315 (39)
												95.4632 (39)
HLP	1.4524	1.4329	1.4280	1.4134	1.4134	1.4107	1.4107	1.4107	1.4107	1.4231	1.4182	1.4329 (40)
HLP (average)												1.4214 (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)						
Southwest	5.7050	46.3896	0.5000	0.0000	0.7700	101.8913 (79)						
Northwest	5.6940	15.0428	0.5000	0.0000	0.7700	32.9768 (81)						
Solar gains	164.0571	257.1163	397.8861	582.8119	692.8333	776.8453	717.8930	618.9710	485.2631	314.3398	198.5740	131.6513 (83)
Total gains	655.2192	744.4885	866.6433	1022.6662	1103.1883	1160.5780	1085.8972	994.3603	877.1235	735.2993	651.9485	609.4639 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, T _{hl} (C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation factor for gains for living area, nil,m (see Table 9a)	51.6075	52.3101	52.4887	53.0321	53.0321	53.1305	53.1305	53.1305	53.1305	52.6686	52.8497	52.3101 (85)
tau	4.4405	4.4873	4.4992	4.5355	4.5355	4.5420	4.5420	4.5420	4.5420	4.5112	4.5233	4.4873
alpha	0.9864	0.9763	0.9417	0.8417	0.6677	0.4500	0.3215	0.3505	0.6131	0.8834	0.9701	0.9893 (86)
util living area	19.9049	20.0643	20.3748	20.7213	20.9235	20.9895	20.9982	20.9975	20.9614	20.7112	20.2858	19.8847 (87)
MIT	19.7234	19.7382	19.7419	19.7531	19.7531	19.7551	19.7551	19.7551	19.7551	19.7457	19.7494	19.7382 (88)
util rest of house	0.9813	0.9678	0.9216	0.7942	0.5874	0.3534	0.2141	0.2337	0.5012	0.8315	0.9571	0.9852 (89)
MIT 2	18.7799	18.9471	19.2464	19.5623	19.7141	19.7520	19.7549	19.7548	19.7414	19.5596	19.1744	18.7722 (90)
Living area fraction	19.0948	19.2598	19.5623	19.8868	20.0526	20.0984	20.1029	20.1027	20.0829	19.8820	19.4855	19.0836 (92)
Temperature adjustment	18.9448	19.1098	19.4123	19.7368	19.9026	19.9484	19.9529	19.9527	19.9329	19.7320	19.3355	-0.1500 (93)
adjusted MIT												18.9336 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	640.2197	716.4277	793.0388	811.5041	659.2751	427.9214	251.1035	250.9640	454.4628	610.9076	620.2749	598.2513 (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	1321.1837	1290.4468	1161.6130	962.1966	693.1754	430.9443	251.3544	251.3279	467.3688	758.1098	1041.5957	1292.7368 (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	506.6372	385.7408	274.2192	108.4986	25.2219	0.0000	0.0000	0.0000	0.0000	109.5184	303.3509	516.6972 (98)
Space heating												2229.8842 (98)
Space heating per m2												(98) / (4) = 33.2026 (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													2463.9604 (211)
Space heating requirement	506.6372	385.7408	274.2192	108.4986	25.2219	0.0000	0.0000	0.0000	0.0000	109.5184	303.3509	516.6972	(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)	559.8201	426.2329	303.0047	119.8880	27.8695	0.0000	0.0000	0.0000	0.0000	121.0148	335.1944	570.9361	(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	89.7307	89.6450	89.3876	88.7631	87.8386	87.3000	87.3000	87.3000	87.3000	88.7411	89.4694	89.7588	(216)
Fuel for water heating, kWh/month	172.3804	151.3489	157.6945	139.9725	136.8643	120.5283	113.3686	127.7012	128.5182	145.3090	155.3715	167.3887	(219)
Water heating fuel used													1716.4460 (219)
Annual totals kWh/year													
Space heating fuel - main system													2463.9604 (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													4605.2402 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2463.9604	3.8700	95.3553 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1716.4460	3.8700	66.4265 (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			335.0753 (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	2463.9604	0.2160	532.2155 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1716.4460	0.2160	370.7523 (264)
Space and water heating			902.9678 (265)
Pumps and fans	124.7789	0.5190	64.7602 (267)
Energy for lighting	300.0549	0.5190	155.7285 (268)
Total kg/year			1123.4565 (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	2463.9604	1.2200	3006.0317 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1716.4460	1.2200	2094.0641 (264)
Space and water heating			5100.0959 (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			6404.3356 (272)
Primary energy kWh/m2/year			95.3594 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 82
 Current environmental impact rating: B 85

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 82
 Potential environmental impact rating: B 85

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	£255	£255	£0
Space heating	£212	£212	£0
Water heating	£66	£66	£0
Lighting	£57	£57	£0
Total cost of fuels	£335	£335	£0
Total cost of uses	£335	£335	£0
Delivered energy	69 kWh/m ²	69 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	1.1 tonnes	1.1 tonnes	0.0 tonnes
CO2 emissions per m ²	17 kg/m ²	17 kg/m ²	0 kg/m ²
Primary energy	95 kWh/m ²	95 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	666 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	666	Prop Type Ref	Block B
Property	Plot 666		

SAP Rating	82 B	DER	20.71	TER	20.81
Environmental	85 B	% DER<TER	0.47		
CO₂ Emissions (t/year)	1.12	DFEE	58.30	TFEE	61.28
General Requirements Compliance	Pass	% DFEE<TFEE	4.87		

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)	20.81	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	20.71	kgCO ₂ /m ²	Pass
	-0.10 (-0.5%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	61.28	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	58.30	kWh/m ² /yr	
	-3.0 (-4.9%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.27 (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	4.71 (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 West

Windows facing North 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.