

PREDICTED ENERGY ASSESSMENT

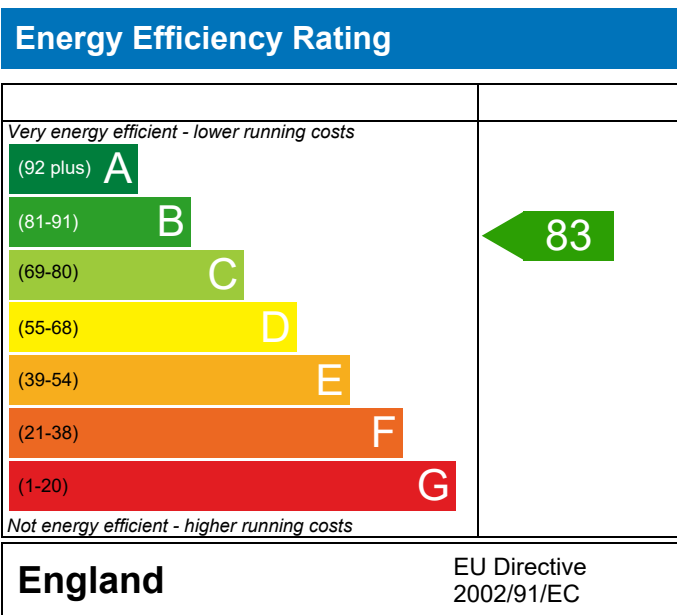


Plot 687

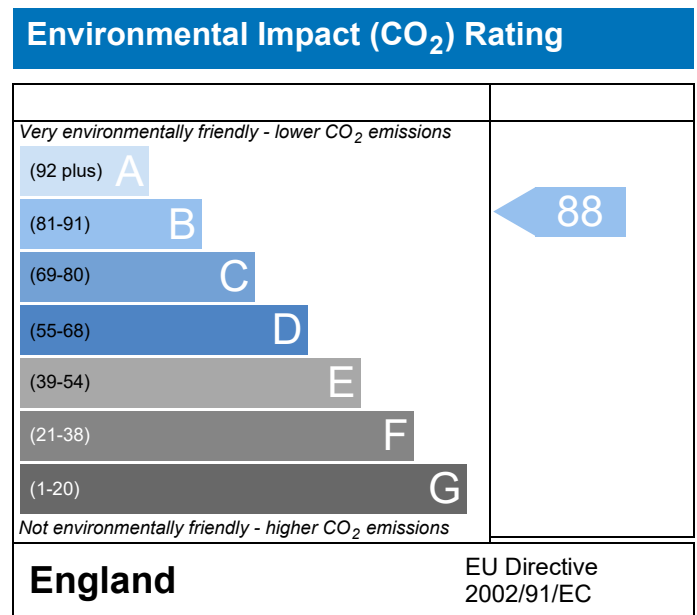
Dwelling type: Flat, End-Terrace
 Date of assessment: 26/02/2021
 Produced by: Michael Juckes
 Total floor area: 44.01 m²

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	687 - PRJ009149		Issued on Date	26/02/2021	
Assessment Reference	687	Prop Type Ref	Block B		
Property	Plot 687				
SAP Rating	83 B	DER	19.75	TER	21.54
Environmental	88 B	% DER<TER	8.30		
CO ₂ Emissions (t/year)	0.73	DFEE	47.18	TFEE	53.57
General Requirements Compliance	Pass	% DFEE<TFEE	11.92		
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)	21.54	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	19.75	kgCO ₂ /m ²	Pass
	-1.79 (-8.3%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	53.57	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	47.18	kWh/m ² /yr	
	-6.4 (-11.9%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.25 (max. 0.30)	0.25 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Roof	0.11 (max. 0.20)	0.11 (max. 0.35)	Pass
Openings	1.36 (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

4.71 m², No overhang

Windows facing South East

3.62 m², No overhang

Air change rate

4.21 ach

Blinds/curtains

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

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type

U-value

Filled Cavity with Edge Sealing

0.00

W/m²K

Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.01 (design value) m³/(h.m²) @ 50 Pa

Maximum

10.0 m³/(h.m²) @ 50 Pa

Pass

10 Key features

Party wall U-value

0.00

W/m²K

Roof U-value

0.11

W/m²K

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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	687 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	687	Prop Type Ref	Block B
Property	Plot 687		

SAP Rating	83 B	DER	19.75	TER	21.54
Environmental	88 B	% DER<TER	8.30		
CO ₂ Emissions (t/year)	0.73	DFEE	47.18	TTEE	53.57
General Requirements Compliance	Pass	% DFEE<TTEE	11.92		

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	44.0100 (1b)	x 2.4700 (2b)	= 108.7047 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	44.0100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 108.7047 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)
Number of intermittent fans				0 * 10 =	0.0000 (7a)
Number of passive vents				0 * 10 =	0.0000 (7b)
Number of flueless gas fires				0 * 40 =	0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				Air changes per hour	0.0000 / (5) = 0.0000 (8)
Pressure test				Yes	
Measured/design AP50				5.0100	
Infiltration rate				0.2505	(18)
Number of sides sheltered				1	(19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.9250 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2317 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000 (22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750 (22a)
Adj infilt rate	0.2954	0.2723	0.2665	0.2491	0.2491	0.2317	0.2317	0.2259	0.2317	0.2607	0.2549	0.2723 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5454	0.5223	0.5165	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5107	0.5049	0.5223 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Windows (Uw = 1.40)			8.3300	1.3258	11.0436		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
W1 - Clad	35.1010	8.3290	26.7720	0.2500	6.6930	61.0100	1633.3597 (29a)
W1 - To Corridor	13.4100	2.1170	11.2930	0.2499	2.8222	106.6200	1204.0597 (29a)
RF - Ins Joist	44.0060		44.0060	0.1100	4.8407	5.8200	256.1149 (30)
Total net area of external elements Aum(A, m ²)			92.5210				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		27.9435		(33)
Party Wall			18.3430	0.0000	0.0000	54.0300	991.0723 (32)
Party Floor			44.0060			40.0000	1760.2400 (32d)
1st Floor Stud			88.4359			5.8200	514.6968 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		6359.5434 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							144.5022 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.8095 (36)
Total fabric heat loss						(33) + (36) =	33.7529 (37)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	19.5661	18.7349	18.5271	17.9363	17.9363	17.9363	17.9363	17.9363	17.9363	18.3193	18.1115	18.7349 (38)
Average = Sum(39)m / 12 =	53.3190	52.4878	52.2800	51.6892	51.6892	51.6892	51.6892	51.6892	51.6892	52.0722	51.8644	52.4878 (39) 52.0539 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.2115	1.1926	1.1879	1.1745	1.1745	1.1745	1.1745	1.1745	1.1745	1.1832	1.1785	1.1926 (40) 1.1828 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.5165 (42)
Average daily hot water use (litres/day)													70.2174 (43)
Daily hot water use													
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
77.2391	74.4304	71.6217	68.8130	66.0043	63.1956	63.1956	66.0043	68.8130	71.6217	74.4304	77.2391	(44)	
Energy conte	114.5434	100.1804	103.3772	90.1267	86.4787	74.6246	69.1506	79.3514	80.2991	93.5808	102.1508	110.9291 (45)	
Energy content (annual)	Total = Sum(45)m =											1104.7928 (45)	
Distribution loss (46)m = 0.15 x (45)m	17.1815	15.0271	15.5066	13.5190	12.9718	11.1937	10.3726	11.9027	12.0449	14.0371	15.3226	16.6394 (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	0.0000 (57)	
Combi loss	14.4823	13.0648	14.4390	13.9444	14.3881	13.8998	14.3480	14.3740	13.9241	14.4180	13.9864	14.4740 (61)	
Total heat required for water heating calculated for each month	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031 (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	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031 (64)	
Total per year (kWh/year) = Sum(64)m =											1274.5357 (64)		
RHI water heating demand													
Heat gains from water heating, kWh/month	41.7063	36.5762	37.9827	33.4532	32.3512	28.2876	26.5796	29.9778	30.1805	34.7201	37.4617	40.5024 (65)	

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	29.7653	26.4373	21.5002	16.2771	12.1673	10.2721	11.0994	14.4274	19.3645	24.5876	28.6974	30.5925 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	196.6178	198.6581	193.5166	182.5711	168.7544	155.7686	147.0933	145.0530	150.1945	161.1400	174.9567	187.9425 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156 (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)	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609 (71)
Water heating gains (Table 5)	56.0568	54.4288	51.0520	46.4628	43.4828	39.2884	35.7253	40.2928	41.9173	46.6668	52.0302	54.4388 (72)
Total internal gains	361.3859	358.4702	345.0149	324.2571	303.3506	284.2752	272.8640	278.7193	290.4223	311.3405	334.6304	351.9198 (73)

6. Solar gains

[Jan]	Area		Solar flux		g		FF		Access		Gains	
	m2		Table 6a		Specific data		Specific data		factor data		W	
			W/m2		or Table 6b		or Table 6c		Table 6d			
Northeast	4.7080		15.0428		0.5000		0.0000		0.7700		27.2663 (75)	
Southeast	3.6210		46.3896		0.5000		0.0000		0.7700		64.6710 (77)	
Solar gains	91.9374	141.8416	214.1309	305.8880	358.0167	399.0860	369.7081	322.5125	258.4002	171.8541	110.8030	74.0765 (83)
Total gains	453.3233	500.3118	559.1458	630.1451	661.3673	683.3611	642.5721	601.2319	548.8225	483.1946	445.4334	425.9964 (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	33.1315	33.6562	33.7900	34.1762	34.1762	34.1762	34.1762	34.1762	33.9248	34.0608	33.6562		
alpha	3.2088	3.2437	3.2527	3.2784	3.2784	3.2784	3.2784	3.2784	3.2617	3.2707	3.2437		
util living area	0.9296	0.9062	0.8494	0.7399	0.5885	0.4086	0.2937	0.3130	0.5237	0.7621	0.8872	0.9376 (86)	
MIT	19.7077	19.8931	20.2353	20.6088	20.8570	20.9674	20.9919	20.9902	20.9277	20.6482	20.1792	19.6891 (87)	
Th 2	19.9108	19.9259	19.9297	19.9405	19.9405	19.9405	19.9405	19.9405	19.9405	19.9335	19.9373	19.9259 (88)	
util rest of house	0.9167	0.8898	0.8240	0.6998	0.5301	0.3366	0.2114	0.2256	0.4442	0.7127	0.8642	0.9258 (89)	
MIT 2	18.7830	18.9716	19.2973	19.6429	19.8487	19.9256	19.9383	19.9379	19.9037	19.6822	19.2590	18.7776 (90)	

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

Living area fraction									$f_{LA} = \text{Living area} / (4) =$	0.4199 (91)		
MIT	19.1713	19.3585	19.6912	20.0485	20.2721	20.3630	20.3807	20.3798	20.3337	20.0879	19.6454	19.1603 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.0213	19.2085	19.5412	19.8985	20.1221	20.2130	20.2307	20.2298	20.1837	19.9379	19.4954	19.0103 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9040	0.8770	0.8136	0.6980	0.5406	0.3555	0.2342	0.2498	0.4632	0.7129	0.8530	0.9136 (94)
Useful gains	409.7866	438.7692	454.9414	439.8681	357.5048	242.9430	150.4708	150.1999	254.2328	344.4631	379.9500	389.1972 (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	726.2718	709.0324	639.9695	532.3206	388.8109	248.7823	151.4874	151.4365	267.9398	423.7560	575.4559	709.1262 (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	235.4650	181.6169	137.6609	66.5658	23.2917	0.0000	0.0000	0.0000	0.0000	58.9939	140.7642	238.0271 (98)
RHI space heating demand												1082.3856 (98)
												1082 (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	44.0100 (1b)	2.4700 (2b)	108.7047 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	44.0100		108.7047 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 108.7047 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 per hour
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)
Number of intermittent fans				0 * 10 =	0.0000 (7a)
Number of passive vents				0 * 10 =	0.0000 (7b)
Number of flueless gas fires				0 * 40 =	0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				0.0000 / (5) =	0.0000 (8)
Pressure test				Yes	
Measured/design AP50				5.0100	
Infiltration rate				0.2505	(18)
Number of sides sheltered				1	(19)
Shelter factor				(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor				(21) = (18) x (20) =	0.2317 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.2954	0.2896	0.2838	0.2549	0.2491	0.2201	0.2201	0.2143	0.2317	0.2491	0.2607	0.2723 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5454	0.5396	0.5338	0.5049	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5107	0.5223 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Windows (Uw = 1.40)			8.3300	1.3258	11.0436		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Clad	35.1010	8.3290	26.7720	0.2500	6.6930	61.0100	1633.3597 (29a)
Wl - To Corridor	13.4100	2.1170	11.2930	0.2499	2.8222	106.6200	1204.0597 (29a)
Rf - Ins Joist	44.0060		44.0060	0.1100	4.8407	5.8200	256.1149 (30)
Total net area of external elements Aum(A, m2)			92.5210				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	27.9435		(33)
Party Wall			18.3430	0.0000	0.0000	54.0300	991.0723 (32)
Party Floor			44.0060			40.0000	1760.2400 (32d)
1st Floor Stud			88.4359			5.8200	514.6968 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 6359.5434 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							144.5022 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.8095 (36)
Total fabric heat loss							(33) + (36) = 33.7529 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	19.5661	19.3583	19.1505	18.1115	17.9363	17.9363	17.9363	17.9363	17.9363	17.9363	18.3193	18.7349 (38)
Heat transfer coeff	53.3190	53.1112	52.9034	51.8644	51.6892	51.6892	51.6892	51.6892	51.6892	51.6892	52.0722	52.4878 (39)
Average = Sum(39)m / 12 =												52.1578 (39)
HLP	1.2115	1.2068	1.2021	1.1785	1.1745	1.1745	1.1745	1.1745	1.1745	1.1745	1.1832	1.1926 (40)
HLP (average)												1.1851 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												1.5165 (42)
Average daily hot water use (litres/day)												70.2174 (43)
Daily hot water use	77.2391	74.4304	71.6217	68.8130	66.0043	63.1956	63.1956	66.0043	68.8130	71.6217	74.4304	77.2391 (44)
Energy conte	114.5434	100.1804	103.3772	90.1267	86.4787	74.6246	69.1506	79.3514	80.2991	93.5808	102.1508	110.9291 (45)
Energy content (annual)												Total = Sum(45)m = 1104.7928 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

Distribution loss (46)m = 0.15 x (45)m	17.1815	15.0271	15.5066	13.5190	12.9718	11.1937	10.3726	11.9027	12.0449	14.0371	15.3226	16.6394 (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	14.4823	13.0648	14.4390	13.9444	14.3881	13.8998	14.3480	14.3740	13.9241	14.4180	13.9864	14.4740 (61)
Total heat required for water heating calculated for each month	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031 (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	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031 (64)
Heat gains from water heating, kWh/month	41.7063	36.5762	37.9827	33.4532	32.3512	28.2876	26.5796	29.9778	30.1805	34.7201	37.4617	40.5024 (65)
												1274.5357 (64)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	29.7653	26.4373	21.5002	16.2771	12.1673	10.2721	11.0994	14.4274	19.3645	24.5876	28.6974	30.5925 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	196.6178	198.6581	193.5166	182.5711	168.7544	155.7686	147.0933	145.0530	150.1945	161.1400	174.9567	187.9425 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156 (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)	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609 (71)
Water heating gains (Table 5)	56.0568	54.4288	51.0520	46.4628	43.4828	39.2884	35.7253	40.2928	41.9173	46.6668	52.0302	54.4388 (72)
Total internal gains	361.3859	358.4702	345.0149	324.2571	303.3506	284.2752	272.8640	278.7193	290.4223	311.3405	334.6304	351.9198 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Northeast	4.7080	11.2829	0.5000	0.0000	0.7700	20.4512 (75)						
Southeast	3.6210	36.7938	0.5000	0.0000	0.7700	51.2937 (77)						
Solar gains	71.7450	129.0013	194.5488	271.2993	331.4830	341.2285	323.9275	277.1713	220.8351	147.4389	87.1710	60.5983 (83)
Total gains	433.1309	487.4715	539.5637	595.5563	634.8336	625.5037	596.7915	555.8907	511.2574	458.7794	421.8014	412.5181 (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	33.1315	33.2612	33.3918	34.0608	34.1762	34.1762	34.1762	34.1762	34.1762	34.1762	33.9248	33.6562
alpha	3.2088	3.2174	3.2261	3.2707	3.2784	3.2784	3.2784	3.2784	3.2784	3.2784	3.2617	3.2437
util living area	0.9466	0.9222	0.8768	0.7855	0.6510	0.4958	0.3709	0.4122	0.6152	0.8230	0.9203	0.9528 (86)
MIT	19.4870	19.7213	20.0718	20.4924	20.7856	20.9343	20.9807	20.9725	20.8659	20.4910	19.9350	19.4530 (87)
Th 2	19.9108	19.9146	19.9183	19.9373	19.9405	19.9405	19.9405	19.9405	19.9405	19.9405	19.9335	19.9259 (88)
util rest of house	0.9370	0.9088	0.8557	0.7505	0.5981	0.4239	0.2858	0.3234	0.5424	0.7854	0.9043	0.9443 (89)
MIT 2	18.5676	18.7969	19.1348	19.5385	19.7933	19.9058	19.9337	19.9302	19.8623	19.5509	19.0232	18.5462 (90)
Living area fraction	18.9536	19.1851	19.5283	19.9390	20.2099	20.3377	20.3734	20.3679	20.2837	19.9457	19.4061	18.9270 (91)
MIT	18.9536	19.1851	19.5283	19.9390	20.2099	20.3377	20.3734	20.3679	20.2837	19.9457	19.4061	18.9270 (92)
Temperature adjustment												-0.1500
adjusted MIT	18.8036	19.0351	19.3783	19.7890	20.0599	20.1877	20.2234	20.2179	20.1337	19.7957	19.2561	18.7770 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	400.6352	436.6384	455.1831	443.7600	383.6789	276.0111	184.3926	193.0221	284.5170	357.6870	376.2876	384.8789 (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	773.3200	750.7296	681.3037	564.7527	432.1189	288.8229	187.2896	197.3417	311.8795	475.3169	632.9935	765.1143 (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	277.2775	211.0693	168.2337	87.1148	36.0394	0.0000	0.0000	0.0000	0.0000	87.5166	184.8283	282.8952 (98)
Space heating												1334.9748 (98)
Space heating per m2												30.3334 (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													1475.1102 (211)
Space heating requirement	277.2775	211.0693	168.2337	87.1148	36.0394	0.0000	0.0000	0.0000	0.0000	87.5166	184.8283	282.8952	(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)	306.3840	233.2257	185.8936	96.2594	39.8225	0.0000	0.0000	0.0000	0.0000	96.7035	204.2302	312.5913	(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	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031	(64)
Efficiency of water heater (217)m	89.4587	89.3563	89.1540	88.7296	88.1202	87.3000	87.3000	87.3000	87.3000	88.7040	89.2378	89.4925	(216)
Fuel for water heating, kWh/month	144.2294	126.7344	132.1491	117.2902	114.4651	101.4025	95.6456	107.3601	107.9303	121.7520	130.1435	140.1270	(219)
Water heating fuel used													1439.2291 (219)
Annual totals kWh/year													
Space heating fuel - main system													1475.1102 (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)													32.1003 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													107.1003 (231)
Electricity for lighting (calculated in Appendix L)													210.2656 (232)
Total delivered energy for all uses													3231.7053 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1475.1102	3.4800	51.3338	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1439.2291	3.4800	50.0852	(247)
Mechanical ventilation fans	32.1003	13.1900	4.2340	(249)
Pumps and fans for heating	75.0000	13.1900	9.8925	(249)
Energy for lighting	210.2656	13.1900	27.7340	(250)
Additional standing charges			120.0000	(251)
Total energy cost			263.2796	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.2423 (257)
SAP value		82.6699
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	1475.1102	0.2160	318.6238	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1439.2291	0.2160	310.8735	(264)
Space and water heating			629.4973	(265)
Pumps and fans	107.1003	0.5190	55.5851	(267)
Energy for lighting	210.2656	0.5190	109.1279	(268)
Total kg/year			794.2102	(272)
CO2 emissions per m2			18.0500	(273)
EI value			88.0436	
EI rating			88	(274)
EI band			B	

Calculation of stars for heating and DHW

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.9050 = 3.845$, stars = 4
Main heating environmental impact	$0.216 \times (1 + 0.29 \times 0.00) / 0.9050 = 0.2387$, stars = 4
Water heating energy efficiency	$3.48 / 0.8845 = 3.934$, stars = 4
Water heating environmental impact	$0.216 / 0.8845 = 0.2442$, 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	44.0100 (1b)	2.4700 (2b)	108.7047 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	44.0100		108.7047 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 108.7047 (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				5.0100	
Infiltration rate				0.2505	(18)
Number of sides sheltered				1	(19)
Shelter factor				(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor				(21) = (18) x (20) =	0.2317 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000 (22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750 (22a)
Adj infilt rate	0.2954	0.2723	0.2665	0.2491	0.2491	0.2317	0.2317	0.2259	0.2317	0.2607	0.2549	0.2723 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5454	0.5223	0.5165	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5107	0.5049	0.5223 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Windows (Uw = 1.40)			8.3300	1.3258	11.0436		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Clad	35.1010	8.3290	26.7720	0.2500	6.6930	61.0100	1633.3597 (29a)
Wl - To Corridor	13.4100	2.1170	11.2930	0.2499	2.8222	106.6200	1204.0597 (29a)
Rf - Ins Joist	44.0060		44.0060	0.1100	4.8407	5.8200	256.1149 (30)
Total net area of external elements Aum(A, m ²)			92.5210				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	27.9435		(33)
Party Wall			18.3430	0.0000	0.0000	54.0300	991.0723 (32)
Party Floor			44.0060			40.0000	1760.2400 (32d)
1st Floor Stud			88.4359			5.8200	514.6968 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 6359.5434 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							144.5022 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.8095 (36)
Total fabric heat loss							(33) + (36) = 33.7529 (37)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	19.5661	18.7349	18.5271	17.9363	17.9363	17.9363	17.9363	17.9363	17.9363	18.3193	18.1115	18.7349 (38)
Heat transfer coeff	53.3190	52.4878	52.2800	51.6892	51.6892	51.6892	51.6892	51.6892	51.6892	52.0722	51.8644	52.4878 (39)
Average = Sum(39)m / 12 =												52.0539 (39)
HLP	1.2115	1.1926	1.1879	1.1745	1.1745	1.1745	1.1745	1.1745	1.1745	1.1832	1.1785	1.1926 (40)
HLP (average)												1.1828 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												1.5165 (42)
Average daily hot water use (litres/day)												70.2174 (43)
Daily hot water use	77.2391	74.4304	71.6217	68.8130	66.0043	63.1956	63.1956	66.0043	68.8130	71.6217	74.4304	77.2391 (44)
Energy conte	114.5434	100.1804	103.3772	90.1267	86.4787	74.6246	69.1506	79.3514	80.2991	93.5808	102.1508	110.9291 (45)
Energy content (annual)												Total = Sum(45)m = 1104.7928 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

Distribution loss (46)m = 0.15 x (45)m	17.1815	15.0271	15.5066	13.5190	12.9718	11.1937	10.3726	11.9027	12.0449	14.0371	15.3226	16.6394 (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	14.4823	13.0648	14.4390	13.9444	14.3881	13.8998	14.3480	14.3740	13.9241	14.4180	13.9864	14.4740 (61)
Total heat required for water heating calculated for each month	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031 (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	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031 (64)
Heat gains from water heating, kWh/month	41.7063	36.5762	37.9827	33.4532	32.3512	28.2876	26.5796	29.9778	30.1805	34.7201	37.4617	40.5024 (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	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	29.7653	26.4373	21.5002	16.2771	12.1673	10.2721	11.0994	14.4274	19.3645	24.5876	28.6974	30.5925 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	196.6178	198.6581	193.5166	182.5711	168.7544	155.7686	147.0933	145.0530	150.1945	161.1400	174.9567	187.9425 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156 (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)	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609 (71)
Water heating gains (Table 5)	56.0568	54.4288	51.0520	46.4628	43.4828	39.2884	35.7253	40.2928	41.9173	46.6668	52.0302	54.4388 (72)
Total internal gains	361.3859	358.4702	345.0149	324.2571	303.3506	284.2752	272.8640	278.7193	290.4223	311.3405	334.6304	351.9198 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Northeast	4.7080	15.0428	0.5000	0.0000	0.7700	27.2663 (75)						
Southeast	3.6210	46.3896	0.5000	0.0000	0.7700	64.6710 (77)						
Solar gains	91.9374	141.8416	214.1309	305.8880	358.0167	399.0860	369.7081	322.5125	258.4002	171.8541	110.8030	74.0765 (83)
Total gains	453.3233	500.3118	559.1458	630.1451	661.3673	683.3611	642.5721	601.2319	548.8225	483.1946	445.4334	425.9964 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, T _{hl} (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	33.1315	33.6562	33.7900	34.1762	34.1762	34.1762	34.1762	34.1762	34.1762	33.9248	34.0608	33.6562
alpha	3.2088	3.2437	3.2527	3.2784	3.2784	3.2784	3.2784	3.2784	3.2784	3.2617	3.2707	3.2437
util living area	0.9296	0.9062	0.8494	0.7399	0.5885	0.4086	0.2937	0.3130	0.5237	0.7621	0.8872	0.9376 (86)
MIT	19.7077	19.8931	20.2353	20.6088	20.8570	20.9674	20.9919	20.9902	20.9277	20.6482	20.1792	19.6891 (87)
Th 2	19.9108	19.9259	19.9297	19.9405	19.9405	19.9405	19.9405	19.9405	19.9405	19.9335	19.9373	19.9259 (88)
util rest of house	0.9167	0.8898	0.8240	0.6998	0.5301	0.3366	0.2114	0.2256	0.4442	0.7127	0.8642	0.9258 (89)
MIT 2	18.7830	18.9716	19.2973	19.6429	19.8487	19.9256	19.9383	19.9379	19.9037	19.6822	19.2590	18.7776 (90)
Living area fraction										f _{LA} = Living area / (4) =		
MIT	19.1713	19.3585	19.6912	20.0485	20.2721	20.3630	20.3807	20.3798	20.3337	20.0879	19.6454	19.1603 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.0213	19.2085	19.5412	19.8985	20.1221	20.2130	20.2307	20.2298	20.1837	19.9379	19.4954	19.0103 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9040	0.8770	0.8136	0.6980	0.5406	0.3555	0.2342	0.2498	0.4632	0.7129	0.8530	0.9136 (94)
Ext temp.	409.7866	438.7692	454.9414	439.8681	357.5048	242.9430	150.4708	150.1999	254.2328	344.4631	379.9500	389.1972 (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	726.2718	709.0324	639.9695	532.3206	388.8109	248.7823	151.4874	151.4365	267.9398	423.7560	575.4559	709.1262 (97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000 (97a)
Space heating per m2	235.4650	181.6169	137.6609	66.5658	23.2917	0.0000	0.0000	0.0000	0.0000	58.9939	140.7642	238.0271 (98)
												1082.3856 (98)
												(98) / (4) = 24.5941 (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													1196.0062 (211)
Space heating requirement	235.4650	181.6169	137.6609	66.5658	23.2917	0.0000	0.0000	0.0000	0.0000	58.9939	140.7642	238.0271	(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)	260.1823	200.6817	152.1115	73.5534	25.7367	0.0000	0.0000	0.0000	0.0000	65.1867	155.5406	263.0134	(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	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031	(64)
Efficiency of water heater (217)m	89.3408	89.2436	88.9956	88.5210	87.8829	87.3000	87.3000	87.3000	87.3000	88.4043	89.0248	89.3696	(216)
Fuel for water heating, kWh/month	144.4198	126.8944	132.3843	117.5665	114.7741	101.4025	95.6456	107.3601	107.9303	122.1647	130.4549	140.3196	(219)
Water heating fuel used													1441.3167 (219)
Annual totals kWh/year													
Space heating fuel - main system													1196.0062 (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)													32.1003 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													107.1003 (231)
Electricity for lighting (calculated in Appendix L)													210.2656 (232)
Total delivered energy for all uses													2954.6888 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1196.0062	3.8700	46.2854 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1441.3167	3.8700	55.7790 (247)
Mechanical ventilation fans	32.1003	18.9000	6.0670 (249)
Pumps and fans for heating	75.0000	18.9000	14.1750 (249)
Energy for lighting	210.2656	18.9000	39.7402 (250)
Additional standing charges			93.0000 (251)
Total energy cost			255.0466 (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	1196.0062	0.2160	258.3373 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1441.3167	0.2160	311.3244 (264)
Space and water heating			569.6617 (265)
Pumps and fans	107.1003	0.5190	55.5851 (267)
Energy for lighting	210.2656	0.5190	109.1279 (268)
Total kg/year			734.3747 (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	1196.0062	1.2200	1459.1276 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1441.3167	1.2200	1758.4063 (264)
Space and water heating			3217.5339 (265)
Pumps and fans	107.1003	3.0700	328.7979 (267)
Energy for lighting	210.2656	3.0700	645.5155 (268)
Primary energy kWh/year			4191.8473 (272)
Primary energy kWh/m2/year			95.2476 (273)

SAP 2012 EPC IMPROVEMENTS

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

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

(For testing purposes):

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

Recommended measures: (none)	SAP change	Cost change	CO2 change
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Recommended measures (none)	Typical annual savings	Energy efficiency	Environmental impact
	Total Savings £0	0.00 kg/m ²	
Potential energy efficiency rating:		B 83	
Potential environmental impact rating:			B 88

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

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

	Current	Potential	Saving
Electricity	£60	£60	£0
Mains gas	£195	£195	£0
Space heating	£160	£160	£0
Water heating	£56	£56	£0
Lighting	£40	£40	£0
Total cost of fuels	£255	£255	£0
Total cost of uses	£256	£256	£0
Delivered energy	67 kWh/m ²	67 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	0.7 tonnes	0.7 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	687 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	687	Prop Type Ref	Block B
Property	Plot 687		

SAP Rating	83 B	DER	19.75	TER	21.54
Environmental	88 B	% DER<TER	8.30		
CO₂ Emissions (t/year)	0.73	DFEE	47.18	TFEE	53.57
General Requirements Compliance	Pass	% DFEE<TFEE	11.92		

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)	21.54	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	19.75	kgCO ₂ /m ²	Pass
	-1.79 (-8.3%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	53.57	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	47.18	kWh/m ² /yr	
	-6.4 (-11.9%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.25 (max. 0.30)	0.25 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Roof	0.11 (max. 0.20)	0.11 (max. 0.35)	Pass
Openings	1.36 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

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

Limiting System Efficiencies

4 Heating efficiency

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

Calculation Type: New Build (As Designed)



Secondary heating system

None

5 Cylinder insulation

Hot water storage

No cylinder

6 Controls

Space heating controls

Programmer, room thermostat and TRVs

Pass

Hot water controls

No cylinder

Boiler interlock

Yes

Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100

%

Minimum

75

%

Pass

8 Mechanical ventilation

Continuous extract system (decentralised)

Specific fan power

0.1900 0.1800

Maximum

0.7

Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Southern England)

Slight

Pass

Based on:

Overshading

Average

Windows facing North East

4.71 m², No overhang

Windows facing South East

3.62 m², No overhang

Air change rate

4.21 ach

Blinds/curtains

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

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type

U-value

Filled Cavity with Edge Sealing

0.00

W/m²K

Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.01 (design value)

Maximum

10.0

Pass

10 Key features

Party wall U-value

0.00

W/m²K

Roof U-value

0.11

W/m²K

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