

PREDICTED ENERGY ASSESSMENT



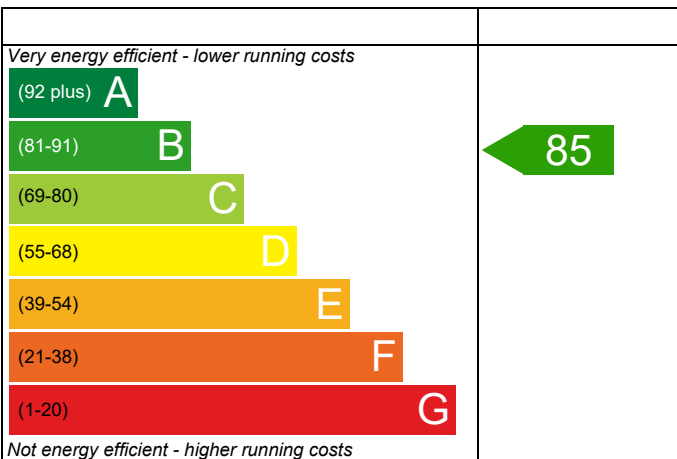
Plot 673

Dwelling type: Flat, End-Terrace
 Date of assessment: 26/02/2021
 Produced by: Michael Juckes
 Total floor area: 69.37 m²

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

The energy performance has been assessed using the Government approved SAP2012 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.

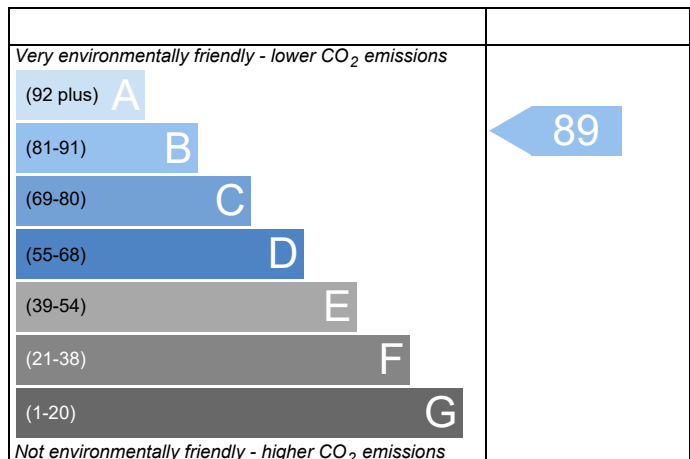
Energy Efficiency Rating



England EU Directive 2002/91/EC

The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO₂) Rating



England EU Directive 2002/91/EC

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

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

BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)



Property Reference	673 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	673	Prop Type Ref	Block B
Property	Plot 673		

SAP Rating	85 B	DER	14.74	TER	16.14
Environmental	89 B	% DER<TER	8.65		
CO ₂ Emissions (t/year)	0.84	DFEE	33.23	TFEE	37.07
General Requirements Compliance	Pass	% DFEE<TFEE	10.38		

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)	16.14	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	14.74	kgCO ₂ /m ²	Pass
	-1.40 (-8.7%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	37.07	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	33.23	kWh/m ² /yr	
	-3.9 (-10.5%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.26 (max. 0.30)	0.26 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Openings	1.37 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

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

Limiting System Efficiencies

4 Heating efficiency

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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	
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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 South East	4.95 m ² , No overhang	
Windows facing South West	7.28 m ² , 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/m ² K	Pass

Air permeability and pressure testing

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

10 Key features

Party wall U-value	0.00	W/m ² K	
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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	673 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	673	Prop Type Ref	Block B
Property	Plot 673		

SAP Rating	85 B	DER	14.74	TER	16.14
Environmental	89 B	% DER<TER	8.65		
CO ₂ Emissions (t/year)	0.84	DFEE	33.23	TTEE	37.07
General Requirements Compliance	Pass	% DFEE<TTEE	10.38		

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	69.3700 (1b)	x 2.4600 (2b)	= 170.6502 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	69.3700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 170.6502 (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)								
Wind speed	Jan 5.1000	Feb 4.7000	Mar 4.6000	Apr 4.3000	May 4.3000	Jun 4.0000	Jul 4.0000	Aug 3.9000	Sep 4.0000	Oct 4.5000	Nov 4.4000	Dec 4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.2954	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													
If mechanical ventilation:													0.5000 (23a)
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)			12.2200	1.3258	16.2140		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
W1 - Brick	44.8110	12.2200	32.5910	0.2600	8.4737	58.7400	1914.3953 (29a)
W1 - To Corridor	27.0600	2.1170	24.9430	0.2499	6.2335	106.6200	2659.4227 (29a)
Total net area of external elements Aum(A, m ²)			71.8840				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	33.4652			(33)
Party Wall			13.8130	0.0000	0.0000	54.0300	746.3164 (32)
Party Floor			69.3710			40.0000	2774.8400 (32d)
Party Ceiling			69.3710			70.0000	4855.9700 (32b)
1st Floor Stud			134.5571			5.8200	783.1222 (32c)
Heat capacity Cm = Sum(A x k)			(28)...(30) + (32) + (32a)...(32e) =				13734.0666 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							197.9828 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.8722 (36)
Total fabric heat loss			(33) + (36) =				39.3373 (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)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	30.7158	29.4110	29.0847	28.1573	28.1573	28.1573	28.1573	28.1573	28.1573	28.7585	28.4323	29.4110 (38)
Heat transfer coeff	70.0532	68.7483	68.4221	67.4946	67.4946	67.4946	67.4946	67.4946	67.4946	68.0959	67.7697	68.7483 (39)
Average = Sum(39)m / 12 =												68.0671 (39)
HLP	1.0098	0.9910	0.9863	0.9730	0.9730	0.9730	0.9730	0.9730	0.9730	0.9816	0.9769	0.9910 (40)
HLP (average)												0.9812 (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												2.2307 (42)
Average daily hot water use (litres/day)												87.1799 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy content (annual)	95.8979	92.4107	88.9235	85.4363	81.9491	78.4619	78.4619	81.9491	85.4363	88.9235	92.4107	95.8979 (44)
Distribution loss (46)m = 0.15 x (45)m	142.2138	124.3811	128.3502	111.8988	107.3695	92.6518	85.8555	98.5204	99.6971	116.1873	126.8275	137.7265 (45)
Water storage loss:	21.3321	18.6572	19.2525	16.7848	16.1054	13.8978	12.8783	14.7781	14.9546	17.4281	19.0241	20.6590 (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	14.6261	13.1859	14.5593	14.0451	14.4809	13.9764	14.4190	14.4591	14.0138	14.5269	14.1099	14.6131 (61)
Total heat required for water heating calculated for each month	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (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	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (64)
RHI water heating demand												1542.6949 (64)
Heat gains from water heating, kWh/month	50.9426	44.6532	46.3163	40.7176	39.3206	34.3008	32.1517	36.3728	36.6527	42.2640	45.6976	49.4473 (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	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	44.7344	39.7327	32.3128	24.4629	18.2863	15.4380	16.6813	21.6831	29.1029	36.9529	43.1295	45.9777 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	292.2720	295.3049	287.6621	271.3917	250.8531	231.5498	218.6540	215.6211	223.2638	239.5343	260.0728	279.3762 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151 (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)	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293 (71)
Water heating gains (Table 5)	68.4712	66.4482	62.2530	56.5523	52.8503	47.6400	43.2146	48.8882	50.9066	56.8064	63.4689	66.4615 (72)
Total internal gains	503.7074	499.7155	480.4577	450.6366	420.2194	392.8576	376.7797	384.4221	401.5031	431.5234	464.9010	490.0451 (73)

6. Solar gains

[Jan]												
	Area	Solar flux	g	FF	Access	Gains						
	m2	Table 6a	or Table 6b	Specific data	factor data	W						
		W/m2	Specific data	or Table 6c	Table 6d							
Southeast	4.9450	46.3896	0.5000	0.0000	0.7700	88.3177 (77)						
Southwest	7.2750	46.3896	0.5000	0.0000	0.7700	129.9315 (79)						
Solar gains	218.2491	317.5157	432.7165	549.0183	591.3181	637.4240	598.9641	557.3733	497.6558	371.1889	258.9512	178.4085 (83)
Total gains	721.9565	817.2312	913.1742	999.6549	1011.5376	1030.2817	975.7438	941.7954	899.1589	802.7124	723.8522	668.4536 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	54.4589	55.4925	55.7571	56.5233	56.5233	56.5233	56.5233	56.5233	56.5233	56.0242	56.2939	55.4925
alpha	4.6306	4.6995	4.7171	4.7682	4.7682	4.7682	4.7682	4.7682	4.7682	4.7349	4.7529	4.6995
util living area	0.9449	0.9107	0.8357	0.7044	0.5443	0.3649	0.2557	0.2648	0.4448	0.7106	0.8868	0.9552 (86)
MIT	20.3136	20.4837	20.7072	20.8900	20.9725	20.9966	20.9995	20.9994	20.9916	20.9057	20.6430	20.2831 (87)
Th 2	20.0751	20.0908	20.0947	20.1059	20.1059	20.1059	20.1059	20.1059	20.1059	20.0987	20.1026	20.0908 (88)
util rest of house	0.9329	0.8932	0.8072	0.6628	0.4914	0.3075	0.1940	0.2010	0.3808	0.6583	0.8616	0.9450 (89)
MIT 2	19.4825	19.6554	19.8624	20.0276	20.0899	20.1046	20.1058	20.1058	20.1022	20.0370	19.8174	19.4674 (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) =	0.4159 (91)	
MIT	19.8282	19.9999	20.2137	20.3862	20.4569	20.4756	20.4775	20.4775	20.4721	20.3983	20.1608	19.8067 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.6782	19.8499	20.0637	20.2362	20.3069	20.3256	20.3275	20.3275	20.3221	20.2483	20.0108	19.6567 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9269	0.8880	0.8062	0.6691	0.5035	0.3217	0.2093	0.2168	0.3965	0.6675	0.8588	0.9393 (94)
Useful gains	669.1478	725.7038	736.1868	668.9018	509.3407	331.4231	204.2465	204.2274	356.4825	535.7830	621.6204	627.8638 (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	1000.2313	972.7801	873.3207	717.8877	520.1757	332.4485	204.3400	204.3371	359.2114	575.2944	786.8572	973.2469 (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	246.3261	166.0353	102.0277	35.2698	8.0612	0.0000	0.0000	0.0000	0.0000	29.3965	118.9705	256.9650 (98)
RHI space heating demand												963.0521 (98)
												963 (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	69.3700 (1b)	x 2.4600 (2b)	= 170.6502 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	69.3700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 170.6502 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 per hour
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)
Number of intermittent fans				0 * 10 =	0.0000 (7a)
Number of passive vents				0 * 10 =	0.0000 (7b)
Number of flueless gas fires				0 * 40 =	0.0000 (7c)
Air changes per hour					
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				0.0000 / (5) =	0.0000 (8)
Pressure test				Yes	
Measured/design AP50				5.0100	
Infiltration rate				0.2505	(18)
Number of sides sheltered				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				0.2549	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)			12.2200	1.3258	16.2140		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Brick	44.8110	12.2200	32.5910	0.2600	8.4737	58.7400	1914.3953 (29a)
Wl - To Corridor	27.0600	2.1170	24.9430	0.2499	6.2335	106.6200	2659.4227 (29a)
Total net area of external elements Aum(A, m2)			71.8840				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	33.4652		(33)
Party Wall			13.8130	0.0000	0.0000	54.0300	746.3164 (32)
Party Floor			69.3710			40.0000	2774.8400 (32d)
Party Ceiling			69.3710			70.0000	4855.9700 (32b)
1st Floor Stud			134.5571			5.8200	783.1222 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	13734.0666 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							197.9828 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.8722 (36)
Total fabric heat loss						(33) + (36) =	39.3373 (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	30.7158	30.3896	30.0634	28.4323	28.1573	28.1573	28.1573	28.1573	28.1573	28.1573	28.7585	29.4110 (38)
Heat transfer coeff	70.0532	69.7270	69.4008	67.7697	67.4946	67.4946	67.4946	67.4946	67.4946	67.4946	68.0959	68.7483 (39)
Average = Sum(39)m / 12 =												68.2302 (39)
HLP	1.0098	1.0051	1.0004	0.9769	0.9730	0.9730	0.9730	0.9730	0.9730	0.9730	0.9816	0.9910 (40)
HLP (average)												0.9836 (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												2.2307 (42)
Average daily hot water use (litres/day)												87.1799 (43)
Daily hot water use	95.8979	92.4107	88.9235	85.4363	81.9491	78.4619	78.4619	81.9491	85.4363	88.9235	92.4107	95.8979 (44)
Energy conte	142.2138	124.3811	128.3502	111.8988	107.3695	92.6518	85.8555	98.5204	99.6971	116.1873	126.8275	137.7265 (45)
Energy content (annual)										Total = Sum(45)m =		1371.6794 (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	21.3321	18.6572	19.2525	16.7848	16.1054	13.8978	12.8783	14.7781	14.9546	17.4281	19.0241	20.6590 (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	14.6261	13.1859	14.5593	14.0451	14.4809	13.9764	14.4190	14.4591	14.0138	14.5269	14.1099	14.6131 (61)
Total heat required for water heating calculated for each month	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (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	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (64)
Heat gains from water heating, kWh/month	50.9426	44.6532	46.3163	40.7176	39.3206	34.3008	32.1517	36.3728	36.6527	42.2640	45.6976	49.4473 (65)
Solar input (sum of months) = Sum(63)m = 0.0000 (63)												
Total per year (kWh/year) = Sum(64)m = 1542.6949 (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	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	44.7344	39.7327	32.3128	24.4629	18.2863	15.4380	16.6813	21.6831	29.1029	36.9529	43.1295	45.9777 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	292.2720	295.3049	287.6621	271.3917	250.8531	231.5498	218.6540	215.6211	223.2638	239.5343	260.0728	279.3762 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151 (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)	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293 (71)
Water heating gains (Table 5)	68.4712	66.4482	62.2530	56.5523	52.8503	47.6400	43.2146	48.8882	50.9066	56.8064	63.4689	66.4615 (72)
Total internal gains	503.7074	499.7155	480.4577	450.6366	420.2194	392.8576	376.7797	384.4221	401.5031	431.5234	464.9010	490.0451 (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
Southeast	4.9450	36.7938	0.5000	0.0000	0.7700	70.0490 (77)
Southwest	7.2750	36.7938	0.5000	0.0000	0.7700	103.0549 (79)
Solar gains	173.1039	294.8601	403.4404	499.8822	559.9097	555.8608
Total gains	676.8114	794.5756	883.8981	950.5188	980.1292	948.7184
						535.9091
						491.1259
						436.8406
						325.8832
						207.3386
						148.1409 (83)
						638.1860 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)	21.0000 (85)											
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	54.4589	54.7137	54.9708	56.2939	56.5233	56.5233	56.5233	56.5233	56.5233	56.5233	56.0242	55.4925
alpha	4.6306	4.6476	4.6647	4.7529	4.7682	4.7682	4.7682	4.7682	4.7682	4.7682	4.7349	4.6995
util living area	0.9650	0.9317	0.8724	0.7601	0.6106	0.4494	0.3243	0.3530	0.5400	0.7938	0.9333	0.9715 (86)
MIT	20.1362	20.3603	20.6060	20.8359	20.9508	20.9906	20.9984	20.9976	20.9781	20.8302	20.4632	20.1020 (87)
Th 2	20.0751	20.0790	20.0830	20.1026	20.1059	20.1059	20.1059	20.1059	20.1059	20.1059	20.0987	20.0908 (88)
util rest of house	0.9573	0.9180	0.8489	0.7226	0.5601	0.3890	0.2590	0.2852	0.4756	0.7518	0.9176	0.9651 (89)
MIT 2	19.3109	19.5286	19.7608	19.9807	20.0749	20.1015	20.1054	20.1052	20.0947	19.9843	19.6474	19.2909 (90)
Living area fraction	19.6542	19.8745	20.1123	20.3364	20.4392	20.4713	20.4768	20.4763	20.4621	20.3361	19.9867	19.6282 (92)
Temperature adjustment	19.5042	19.7245	19.9623	20.1864	20.2892	20.3213	20.3268	20.3263	20.3121	20.1861	19.8367	-0.1500
adjusted MIT												19.4782 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9516	0.9120	0.8455	0.7263	0.5707	0.4037	0.2752	0.3020	0.4908	0.7558	0.9124	0.9599 (94)
Ext temp.	644.0353	724.6216	747.3364	690.3372	559.3751	382.9873	251.1492	264.3846	411.4389	572.4746	613.3237	612.6049 (95)
Heat loss rate W	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)
Month fracti	1065.1001	1033.6670	934.2939	764.8731	579.7226	386.1557	251.5400	265.0045	419.2839	647.0094	867.3137	1050.3534 (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	313.2722	207.6785	139.0964	53.6658	15.1385	0.0000	0.0000	0.0000	0.0000	55.4539	182.8728	325.6849 (98)
												1292.8629 (98)
												(98) / (4) = 18.6372 (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													1428.5778 (211)
Space heating requirement	313.2722	207.6785	139.0964	53.6658	15.1385	0.0000	0.0000	0.0000	0.0000	55.4539	182.8728	325.6849	(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)	346.1571	229.4790	153.6976	59.2992	16.7276	0.0000	0.0000	0.0000	0.0000	61.2750	202.0694	359.8728	(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	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396	(64)
Efficiency of water heater (217)m	89.4066	89.1972	88.8496	88.2322	87.6425	87.3000	87.3000	87.3000	87.3000	88.2293	89.0788	89.4550	(216)
Fuel for water heating, kWh/month	175.4230	154.2279	160.8443	142.7415	139.0313	122.1399	114.8619	129.4153	130.2530	148.1528	158.2165	170.2974	(219)
Water heating fuel used													1745.6049 (219)
Annual totals kWh/year													
Space heating fuel - main system													1428.5778 (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)													50.3927 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													125.3927 (231)
Electricity for lighting (calculated in Appendix L)													316.0093 (232)
Total delivered energy for all uses													3615.5847 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1428.5778	3.4800	49.7145 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1745.6049	3.4800	60.7471 (247)
Mechanical ventilation fans	50.3927	13.1900	6.6468 (249)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	316.0093	13.1900	41.6816 (250)
Additional standing charges			120.0000 (251)
Total energy cost			288.6825 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.0601 (257)
SAP value		85.2112
SAP rating (Section 12)		85 (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	1428.5778	0.2160	308.5728 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1745.6049	0.2160	377.0507 (264)
Space and water heating			685.6235 (265)
Pumps and fans	125.3927	0.5190	65.0788 (267)
Energy for lighting	316.0093	0.5190	164.0088 (268)
Total kg/year			914.7111 (272)
CO2 emissions per m2			13.1900 (273)
EI value			89.2829
EI rating			89 (274)
EI band			B

Calculation of stars for heating and DHW

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.9050 = 3.845$, stars = 4
Main heating environmental impact	$0.216 \times (1 + 0.29 \times 0.00) / 0.9050 = 0.2387$, stars = 4
Water heating energy efficiency	$3.48 / 0.8827 = 3.942$, stars = 4
Water heating environmental impact	$0.216 / 0.8827 = 0.2447$, stars = 4

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CALCULATION OF ENERGY RATINGS 09 Jan 2014

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Calculation Type: New Build (As Designed)



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

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
 CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	69.3700 (1b)	x 2.4600 (2b)	= 170.6502 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	69.3700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 170.6502 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 per hour
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)
Number of intermittent fans				0 * 10 =	0.0000 (7a)
Number of passive vents				0 * 10 =	0.0000 (7b)
Number of flueless gas fires				0 * 40 =	0.0000 (7c)
Air changes per hour					
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				0.0000 / (5) =	0.0000 (8)
Pressure test				Yes	
Measured/design AP50				5.0100	
Infiltration rate				0.2505	(18)
Number of sides sheltered				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 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)			12.2200	1.3258	16.2140		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Brick	44.8110	12.2200	32.5910	0.2600	8.4737	58.7400	1914.3953 (29a)
Wl - To Corridor	27.0600	2.1170	24.9430	0.2499	6.2335	106.6200	2659.4227 (29a)
Total net area of external elements Aum(A, m2)			71.8840				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	33.4652		(33)
Party Wall			13.8130	0.0000	0.0000	54.0300	746.3164 (32)
Party Floor			69.3710			40.0000	2774.8400 (32d)
Party Ceiling			69.3710			70.0000	4855.9700 (32b)
1st Floor Stud			134.5571			5.8200	783.1222 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	13734.0666 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							197.9828 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.8722 (36)
Total fabric heat loss						(33) + (36) =	39.3373 (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	30.7158	29.4110	29.0847	28.1573	28.1573	28.1573	28.1573	28.1573	28.1573	28.7585	28.4323	29.4110 (38)
Heat transfer coeff	70.0532	68.7483	68.4221	67.4946	67.4946	67.4946	67.4946	67.4946	67.4946	68.0959	67.7697	68.7483 (39)
Average = Sum(39)m / 12 =												68.0671 (39)
HLP	1.0098	0.9910	0.9863	0.9730	0.9730	0.9730	0.9730	0.9730	0.9730	0.9816	0.9769	0.9910 (40)
HLP (average)												0.9812 (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												2.2307 (42)
Average daily hot water use (litres/day)												87.1799 (43)
Daily hot water use	95.8979	92.4107	88.9235	85.4363	81.9491	78.4619	78.4619	81.9491	85.4363	88.9235	92.4107	95.8979 (44)
Energy conte	142.2138	124.3811	128.3502	111.8988	107.3695	92.6518	85.8555	98.5204	99.6971	116.1873	126.8275	137.7265 (45)
Energy content (annual)										Total = Sum(45)m =		1371.6794 (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	21.3321	18.6572	19.2525	16.7848	16.1054	13.8978	12.8783	14.7781	14.9546	17.4281	19.0241	20.6590 (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	14.6261	13.1859	14.5593	14.0451	14.4809	13.9764	14.4190	14.4591	14.0138	14.5269	14.1099	14.6131 (61)
Total heat required for water heating calculated for each month	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (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	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (64)
Heat gains from water heating, kWh/month	50.9426	44.6532	46.3163	40.7176	39.3206	34.3008	32.1517	36.3728	36.6527	42.2640	45.6976	49.4473 (65)
												Solar input (sum of months) = Sum(63)m = 0.0000 (63)
												Total per year (kWh/year) = Sum(64)m = 1542.6949 (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	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	44.7344	39.7327	32.3128	24.4629	18.2863	15.4380	16.6813	21.6831	29.1029	36.9529	43.1295	45.9777 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	292.2720	295.3049	287.6621	271.3917	250.8531	231.5498	218.6540	215.6211	223.2638	239.5343	260.0728	279.3762 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151 (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)	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293 (71)
Water heating gains (Table 5)	68.4712	66.4482	62.2530	56.5523	52.8503	47.6400	43.2146	48.8882	50.9066	56.8064	63.4689	66.4615 (72)
Total internal gains	503.7074	499.7155	480.4577	450.6366	420.2194	392.8576	376.7797	384.4221	401.5031	431.5234	464.9010	490.0451 (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						
Southeast	4.9450	46.3896	0.5000	0.0000	0.7700	88.3177 (77)						
Southwest	7.2750	46.3896	0.5000	0.0000	0.7700	129.9315 (79)						
Solar gains	218.2491	317.5157	432.7165	549.0183	591.3181	637.4240	598.9641	557.3733	497.6558	371.1889	258.9512	178.4085 (83)
Total gains	721.9565	817.2312	913.1742	999.6549	1011.5376	1030.2817	975.7438	941.7954	899.1589	802.7124	723.8522	668.4536 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	54.4589	55.4925	55.7571	56.5233	56.5233	56.5233	56.5233	56.5233	56.5233	56.0242	56.2939	55.4925
alpha	4.6306	4.6995	4.7171	4.7682	4.7682	4.7682	4.7682	4.7682	4.7682	4.7349	4.7529	4.6995
util living area	0.9449	0.9107	0.8357	0.7044	0.5443	0.3649	0.2557	0.2648	0.4448	0.7106	0.8868	0.9552 (86)
MIT	20.3136	20.4837	20.7072	20.8900	20.9725	20.9966	20.9995	20.9994	20.9916	20.9057	20.6430	20.2831 (87)
Th 2	20.0751	20.0908	20.0947	20.1059	20.1059	20.1059	20.1059	20.1059	20.1059	20.0987	20.1026	20.0908 (88)
util rest of house	0.9329	0.8932	0.8072	0.6628	0.4914	0.3075	0.1940	0.2010	0.3808	0.6583	0.8616	0.9450 (89)
MIT 2	19.4825	19.6554	19.8624	20.0276	20.0899	20.1046	20.1058	20.1058	20.1022	20.0370	19.8174	19.4674 (90)
Living area fraction	19.8282	19.9999	20.2137	20.3862	20.4569	20.4756	20.4775	20.4775	20.4721	20.3983	20.1608	19.8067 (91)
MIT	19.8282	19.9999	20.2137	20.3862	20.4569	20.4756	20.4775	20.4775	20.4721	20.3983	20.1608	19.8067 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.6782	19.8499	20.0637	20.2362	20.3069	20.3256	20.3275	20.3275	20.3221	20.2483	20.0108	19.6567 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	669.1478	725.7038	736.1868	668.9018	509.3407	331.4231	204.2465	204.2274	356.4825	535.7830	621.6204	627.8638 (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	1000.2313	972.7801	873.3207	717.8877	520.1757	332.4485	204.3400	204.3371	359.2114	575.2944	786.8572	973.2469 (97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000 (97a)
Space heating kWh	246.3261	166.0353	102.0277	35.2698	8.0612	0.0000	0.0000	0.0000	0.0000	29.3965	118.9705	256.9650 (98)
Space heating												963.0521 (98)
Space heating per m2												(98) / (4) = 13.8828 (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													1064.1460 (211)
Space heating requirement	246.3261	166.0353	102.0277	35.2698	8.0612	0.0000	0.0000	0.0000	0.0000	29.3965	118.9705	256.9650	(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)	272.1835	183.4644	112.7378	38.9722	8.9074	0.0000	0.0000	0.0000	0.0000	32.4823	131.4591	283.9392	(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	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396	(64)
Efficiency of water heater (217)m	89.2276	89.0214	88.6050	87.9806	87.4920	87.3000	87.3000	87.3000	87.3000	87.8705	88.7362	89.2819	(217)
Fuel for water heating, kWh/month	175.7750	154.5325	161.2882	143.1496	139.2704	122.1399	114.8619	129.4153	130.2530	148.7578	158.8274	170.6276	(219)
Water heating fuel used													1748.8986 (219)
Annual totals kWh/year													
Space heating fuel - main system													1064.1460 (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)													50.3927 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													125.3927 (231)
Electricity for lighting (calculated in Appendix L)													316.0093 (232)
Total delivered energy for all uses													3254.4465 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1064.1460	3.8700	41.1824 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1748.8986	3.8700	67.6824 (247)
Mechanical ventilation fans	50.3927	18.9000	9.5242 (249)
Pumps and fans for heating	75.0000	18.9000	14.1750 (249)
Energy for lighting	316.0093	18.9000	59.7257 (250)
Additional standing charges			93.0000 (251)
Total energy cost			285.2898 (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	1064.1460	0.2160	229.8555 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1748.8986	0.2160	377.7621 (264)
Space and water heating			607.6176 (265)
Pumps and fans	125.3927	0.5190	65.0788 (267)
Energy for lighting	316.0093	0.5190	164.0088 (268)
Total kg/year			836.7052 (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	1064.1460	1.2200	1298.2581 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1748.8986	1.2200	2133.6563 (264)
Space and water heating			3431.9144 (265)
Pumps and fans	125.3927	3.0700	384.9555 (267)
Energy for lighting	316.0093	3.0700	970.1484 (268)
Primary energy kWh/year			4787.0183 (272)
Primary energy kWh/m2/year			69.0070 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 85
Current environmental impact rating: B 89

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

(For testing purposes):

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

Recommended measures: (none)	SAP change	Cost change	CO2 change
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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 85
 Potential environmental impact rating: B 89

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

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

	Current	Potential	Saving
Electricity	£83	£83	£0
Mains gas	£202	£202	£0
Space heating	£158	£158	£0
Water heating	£68	£68	£0
Lighting	£60	£60	£0
Total cost of fuels	£285	£285	£0
Total cost of uses	£286	£286	£0
Delivered energy	47 kWh/m ²	47 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	0.8 tonnes	0.8 tonnes	0.0 tonnes
CO2 emissions per m ²	12 kg/m ²	12 kg/m ²	0 kg/m ²
Primary energy	69 kWh/m ²	69 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	673 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	673	Prop Type Ref	Block B
Property	Plot 673		

SAP Rating	85 B	DER	14.74	TER	16.14
Environmental	89 B	% DER<TER	8.65		
CO₂ Emissions (t/year)	0.84	DFEE	33.23	TFEE	37.07
General Requirements Compliance	Pass	% DFEE<TFEE	10.38		

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)	16.14	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	14.74	kgCO ₂ /m ²	Pass
	-1.40 (-8.7%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	37.07	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	33.23	kWh/m ² /yr	
	-3.9 (-10.5%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.26 (max. 0.30)	0.26 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Openings	1.37 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

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

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Boiler system with radiators or underfloor - Mains gas Data from database Ideal LOGIC COMBI ESP1 30 Combi boiler Efficiency: 89.6% SEDBUK2009 Minimum: 88.0%	Pass
Secondary heating system	None	

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



5 Cylinder insulation

Hot water storage

6 Controls

Space heating controls

Hot water controls

Boiler interlock

7 Low energy lights

Percentage of fixed lights with low-energy fittings %

Minimum %

8 Mechanical ventilation

Continuous extract system (decentralised)

Specific fan power

Maximum

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Southern England)

Based on:

Overshading

Windows facing South East

Windows facing South West

Air change rate

Blinds/curtains

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

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

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

Maximum

10 Key features

Party wall U-value W/m²K

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