

PREDICTED ENERGY ASSESSMENT

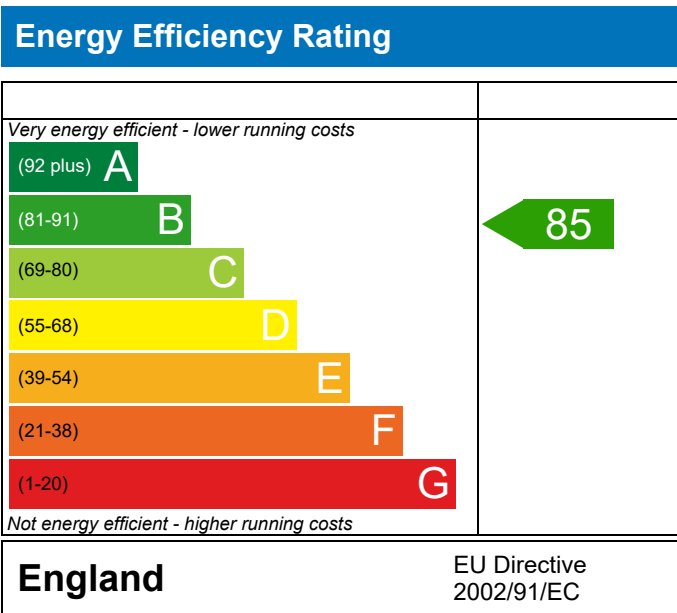


Plot 672

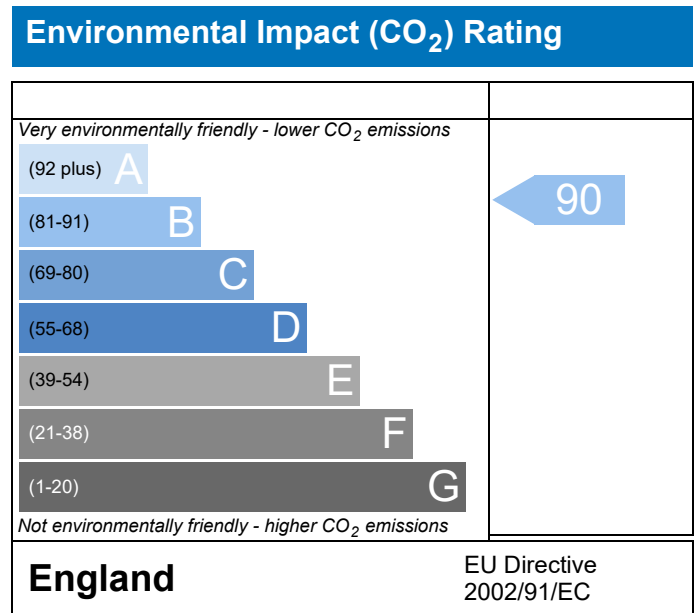
Dwelling type: Flat, Mid-Terrace
 Date of assessment: 26/02/2021
 Produced by: Michael Juckes
 Total floor area: 50.62 m²

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

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



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



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

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

BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)



Property Reference	672 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	672	Prop Type Ref	Block B
Property	Plot 672		

SAP Rating	85 B	DER	15.76	TER	17.57
Environmental	90 B	% DER<TER	10.30		
CO ₂ Emissions (t/year)	0.66	DFEE	33.67	TFEE	37.56
General Requirements Compliance	Pass	% DFEE<TFEE	10.35		

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)	17.57	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	15.76	kgCO ₂ /m ²	Pass
	-1.81 (-10.3%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	37.56	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	33.67	kWh/m ² /yr	
	-3.9 (-10.4%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.25 (max. 0.30)	0.25 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Openings	1.37 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

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

Limiting System Efficiencies

4 Heating efficiency

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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)	Medium	Pass
Based on:		
Overshading	Average	
Windows facing North East	4.85 m ² , No overhang	
Windows facing South East	5.60 m ² , No overhang	
Air change rate	3.87 ach	
Blinds/curtains	Dark-coloured curtain or roller blind, closed 100% of daylight hours	

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type	U-value		
Filled Cavity with Edge Sealing	0.00	W/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	672 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	672	Prop Type Ref	Block B
Property	Plot 672		

SAP Rating	85 B	DER	15.76	TER	17.57
Environmental	90 B	% DER<TER	10.30		
CO ₂ Emissions (t/year)	0.66	DFEE	33.67	TTEE	37.56
General Requirements Compliance	Pass	% DFEE<TTEE	10.35		

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

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour								
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)								
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)								
Number of intermittent fans				0 * 10 =	0.0000 (7a)								
Number of passive vents				0 * 10 =	0.0000 (7b)								
Number of flueless gas fires				0 * 40 =	0.0000 (7c)								
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				Air changes per hour	0.0000 / (5) = 0.0000 (8)								
Pressure test				Yes									
Measured/design AP50				5.0100									
Infiltration rate				0.2505	(18)								
Number of sides sheltered				2	(19)								
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.8500 (20)								
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2129 (21)								
Wind speed	Jan 5.1000	Feb 4.7000	Mar 4.6000	Apr 4.3000	May 4.3000	Jun 4.0000	Jul 4.0000	Aug 3.9000	Sep 4.0000	Oct 4.5000	Nov 4.4000	Dec 4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.2715	0.2502	0.2449	0.2289	0.2289	0.2129	0.2129	0.2076	0.2129	0.2395	0.2342	0.2502	(22b)
Mechanical extract ventilation - decentralised													0.5000 (23a)
If mechanical ventilation:													
Effective ac	0.5215	0.5002	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5002	(25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Windows (Uw = 1.40)			10.4500	1.3258	13.8542		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
W1 - Clad	35.9900	10.4490	25.5410	0.2500	6.3853	61.0100	1558.2564 (29a)
W1 - To Corridor	3.9100	2.1170	1.7930	0.2499	0.4481	106.6200	191.1697 (29a)
Total net area of external elements Aum(A, m ²)			39.9040				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	23.2315		(33)
Party Wall			32.0820	0.0000	0.0000	54.0300	1733.3905 (32)
Party Floor			50.6170			40.0000	2024.6800 (32d)
Party Ceiling			50.6170			70.0000	3543.1900 (32b)
1st Floor Stud			97.5784			5.8200	567.9061 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	9618.5926 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							190.0157 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.5486 (36)
Total fabric heat loss						(33) + (36) =	27.7801 (37)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	21.4293	20.5543	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5543 (38)
Average = Sum(39)m / 12 =	49.2095	48.3345	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3345 (39) 48.4016 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.9721	0.9548	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9548 (40) 0.9562 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.7084 (42)
Average daily hot water use (litres/day)													74.7737 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy content (annual)	82.2511	79.2601	76.2692	73.2782	70.2873	67.2963	67.2963	70.2873	73.2782	76.2692	79.2601	82.2511 (44)	
Distribution loss (46)m = 0.15 x (45)m	121.9760	106.6810	110.0852	95.9749	92.0902	79.4669	73.6377	84.5004	85.5096	99.6532	108.7792	118.1272 (45)	
Water storage loss:	Total = Sum(45)m = 1176.4816 (45)												
Total storage loss	18.2964	16.0021	16.5128	14.3962	13.8135	11.9200	11.0457	12.6751	12.8264	14.9480	16.3169	17.7191 (46)	
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 (56)	
Combi 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 (57)	
Total heat required for water heating calculated for each month	14.5179	13.0947	14.4688	13.9693	14.4111	13.9187	14.3656	14.3951	13.9463	14.4449	14.0170	14.5084 (61)	
Solar input	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356 (62)	
Output from w/h	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)	
RHI water heating demand	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356 (64)	
Heat gains from water heating, kWh/month	44.1865	38.7451	40.2205	35.4040	34.2228	29.9024	28.0759	31.6952	31.9185	36.7459	39.6733	42.9044 (65)	
Total per year (kWh/year) = Sum(64)m = 1347 (64)													

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	33.3087	29.5845	24.0597	18.2148	13.6158	11.4950	12.4207	16.1450	21.6697	27.5147	32.1137	34.2345 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	222.1554	224.4607	218.6514	206.2843	190.6730	176.0005	166.1985	163.8932	169.7024	182.0696	197.6809	212.3533 (68)
Pumps, fans	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586 (69)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Water heating gains (Table 5)	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347 (71)
Total internal gains	59.3904	57.6564	54.0598	49.1722	45.9984	41.5311	37.7365	42.6010	44.3313	49.3897	55.1019	57.6672 (72)
	398.9804	395.8275	380.8969	357.7972	334.4130	313.1526	300.4816	306.7650	319.8293	343.0998	369.0223	388.3809 (73)

6. Solar gains

[Jan]	Area	Solar flux	Specific data	Specific data	Access	Gains						
	m2	Table 6a	g	FF	factor	W						
		W/m2	or Table 6b	or Table 6c	Table 6d							
Northeast	4.8500	15.0428	0.5000	0.0000	0.7700	28.0887 (75)						
Southeast	5.5990	46.3896	0.5000	0.0000	0.7700	99.9981 (77)						
Solar gains	128.0868	194.6770	286.7640	399.0746	459.2444	508.6032	472.4576	417.4782	342.2997	233.8028	153.7460	103.5945 (83)
Total gains	527.0673	590.5044	667.6610	756.8717	793.6573	821.7558	772.9392	724.2433	662.1290	576.9026	522.7683	491.9754 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
alpha	54.2951	55.2780	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2780	
util living area	4.6197	4.6852	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6852	
MIT	0.9372	0.9027	0.8206	0.6744	0.5004	0.3281	0.2311	0.2466	0.4327	0.7032	0.8806	0.9473 (86)	
Th 2	20.3473	20.5056	20.7266	20.9030	20.9790	20.9976	20.9997	20.9995	20.9918	20.9068	20.6443	20.3220 (87)	
util rest of house	20.1066	20.1211	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1211 (88)	
MIT 2	0.9245	0.8849	0.7920	0.6336	0.4515	0.2772	0.1764	0.1882	0.3714	0.6524	0.8555	0.9362 (89)	
	19.5427	19.7033	19.9038	20.0521	20.1090	20.1203	20.1212	20.1212	20.1176	20.0595	19.8357	19.5317 (90)	

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

Living area fraction										FLA = Living area / (4) =	0.4417 (91)	
MIT	19.8981	20.0577	20.2672	20.4280	20.4933	20.5078	20.5092	20.5092	20.5037	20.4338	20.1929	19.8808 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.7481	19.9077	20.1172	20.2780	20.3433	20.3578	20.3592	20.3592	20.3537	20.2838	20.0429	19.7308 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9186	0.8801	0.7919	0.6411	0.4640	0.2909	0.1912	0.2040	0.3878	0.6622	0.8530	0.9304 (94)
Useful gains	484.1526	519.6985	528.6983	485.2607	368.2891	239.0681	147.7908	147.7705	256.7896	382.0443	445.9212	457.7404 (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	706.0631	686.7210	619.4159	516.0315	374.2080	239.5954	147.8423	147.8392	258.7280	409.9938	562.6630	687.8392 (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	165.1014	112.2391	67.4939	22.1550	4.4037	0.0000	0.0000	0.0000	0.0000	20.7944	84.0541	171.1935 (98)
RHI space heating demand												647.4352 (98)
												647 (98)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
 CALCULATION OF ENERGY RATINGS 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	50.6200 (1b)	x 2.4600 (2b)	= 124.5252 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.6200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 124.5252 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 per hour
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)
Number of intermittent fans				0 * 10 =	0.0000 (7a)
Number of passive vents				0 * 10 =	0.0000 (7b)
Number of flueless gas fires				0 * 40 =	0.0000 (7c)
Air changes per hour					
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				0.0000 / (5) =	0.0000 (8)
Pressure test				Yes	
Measured/design AP50					5.0100
Infiltration rate					0.2505 (18)
Number of sides sheltered					2 (19)
Shelter factor				(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor				(21) = (18) x (20) =	0.2129 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.2715	0.2662	0.2608	0.2342	0.2289	0.2023	0.2023	0.1970	0.2129	0.2289	0.2395	0.2502 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												0.5000 (23a)
Effective ac	0.5215	0.5162	0.5108	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5002 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Windows (Uw = 1.40)			10.4500	1.3258	13.8542		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Clad	35.9900	10.4490	25.5410	0.2500	6.3853	61.0100	1558.2564 (29a)
Wl - To Corridor	3.9100	2.1170	1.7930	0.2499	0.4481	106.6200	191.1697 (29a)
Total net area of external elements Aum(A, m2)			39.9040				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	23.2315		(33)
Party Wall			32.0820	0.0000	0.0000	54.0300	1733.3905 (32)
Party Floor			50.6170			40.0000	2024.6800 (32d)
Party Ceiling			50.6170			70.0000	3543.1900 (32b)
1st Floor Stud			97.5784			5.8200	567.9061 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	9618.5926 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							190.0157 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.5486 (36)
Total fabric heat loss						(33) + (36) =	27.7801 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	21.4293	21.2106	20.9918	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5543 (38)
Heat transfer coeff	49.2095	48.9907	48.7720	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3345 (39)
Average = Sum(39)m / 12 =												48.4934 (39)
HLP	0.9721	0.9678	0.9635	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9548 (40)
HLP (average)												0.9580 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												1.7084 (42)
Average daily hot water use (litres/day)												74.7737 (43)
Daily hot water use	82.2511	79.2601	76.2692	73.2782	70.2873	67.2963	67.2963	70.2873	73.2782	76.2692	79.2601	82.2511 (44)
Energy conte	121.9760	106.6810	110.0852	95.9749	92.0902	79.4669	73.6377	84.5004	85.5096	99.6532	108.7792	118.1272 (45)
Energy content (annual)										Total = Sum(45)m =		1176.4816 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

Distribution loss (46)m = 0.15 x (45)m	18.2964	16.0021	16.5128	14.3962	13.8135	11.9200	11.0457	12.6751	12.8264	14.9480	16.3169	17.7191 (46)
Water storage loss:												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	14.5179	13.0947	14.4688	13.9693	14.4111	13.9187	14.3656	14.3951	13.9463	14.4449	14.0170	14.5084 (61)
Total heat required for water heating calculated for each month	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356 (62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356 (64)
Heat gains from water heating, kWh/month	44.1865	38.7451	40.2205	35.4040	34.2228	29.9024	28.0759	31.6952	31.9185	36.7459	39.6733	42.9044 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	33.3087	29.5845	24.0597	18.2148	13.6158	11.4950	12.4207	16.1450	21.6697	27.5147	32.1137	34.2345 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	222.1554	224.4607	218.6514	206.2843	190.6730	176.0005	166.1985	163.8932	169.7024	182.0696	197.6809	212.3533 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347 (71)
Water heating gains (Table 5)	59.3904	57.6564	54.0598	49.1722	45.9984	41.5311	37.7365	42.6010	44.3313	49.3897	55.1019	57.6672 (72)
Total internal gains	398.9804	395.8275	380.8969	357.7972	334.4130	313.1526	300.4816	306.7650	319.8293	343.0998	369.0223	388.3809 (73)

6. Solar gains

[Jan]	Area m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Northeast	4.8500	11.2829	0.5000	0.0000	0.7700	21.0681 (75)						
Southeast	5.5990	36.7938	0.5000	0.0000	0.7700	79.3133 (77)						
Solar gains	100.3814	177.9846	262.1142	355.9282	427.1071	436.5273	415.6533	360.6383	294.3011	201.7227	121.5082	85.0809 (83)
Total gains	499.3618	573.8121	643.0111	713.7254	761.5201	749.6799	716.1349	667.4034	614.1304	544.8225	490.5305	473.4618 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	54.2951	54.5375	54.7821	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867
alpha	4.6197	4.6358	4.6521	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858
util living area	0.9582	0.9252	0.8598	0.7335	0.5687	0.4087	0.2962	0.3318	0.5283	0.7893	0.9257	0.9651 (86)
MIT	20.1812	20.3844	20.6312	20.8533	20.9608	20.9931	20.9988	20.9979	20.9785	20.8262	20.4788	20.1497 (87)
Th 2	20.1066	20.1102	20.1139	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1211 (88)
util rest of house	0.9496	0.9111	0.8360	0.6960	0.5208	0.3541	0.2374	0.2690	0.4662	0.7482	0.9094	0.9578 (89)
MIT 2	19.3825	19.5794	19.8118	20.0123	20.0965	20.1180	20.1209	20.1206	20.1100	19.9955	19.6826	19.3643 (90)
Living area fraction	19.7353	19.9350	20.1738	20.3838	20.4782	20.5045	20.5087	20.5081	20.4936	20.3625	20.0343	19.7112 (92)
Temperature adjustment	19.5853	19.7850	20.0238	20.2338	20.3282	20.3545	20.3587	20.3581	20.3436	20.2125	19.8843	-0.1500
adjusted MIT												19.5612 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9437	0.9053	0.8334	0.7011	0.5323	0.3687	0.2533	0.2860	0.4822	0.7528	0.9043	0.9523 (94)
Ext temp.	471.2548	519.4820	535.8734	500.3635	405.3775	276.4145	181.4256	190.8926	296.1426	410.1246	443.6081	450.8716 (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	752.1802	729.2271	659.5801	547.7260	416.9756	278.0986	181.6448	191.2838	301.7348	464.5405	617.8234	742.4763 (97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000 (97a)
Space heating per m ²	209.0085	140.9487	92.0378	34.1010	8.6290	0.0000	0.0000	0.0000	0.0000	40.4854	125.4350	216.9539 (98)
												867.5994 (98)
												(98) / (4) = 17.1395 (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													958.6733 (211)
Space heating requirement	209.0085	140.9487	92.0378	34.1010	8.6290	0.0000	0.0000	0.0000	0.0000	40.4854	125.4350	216.9539	(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)	230.9486	155.7444	101.6992	37.6807	9.5349	0.0000	0.0000	0.0000	0.0000	44.7353	138.6022	239.7281	(211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating requirement	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356	(64)
Efficiency of water heater (217)m	89.2082	89.0013	88.6317	88.0369	87.5320	87.3000	87.3000	87.3000	87.3000	88.1160	88.8882	89.2587	(217)
Fuel for water heating, kWh/month	153.0060	134.5775	140.5298	124.8842	121.6714	106.9709	100.8056	113.2823	113.9243	129.4863	138.1468	148.5969	(219)
Water heating fuel used													1525.8819 (219)
Annual totals kWh/year													
Space heating fuel - main system													958.6733 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans: (MEVDecentralised, Database: total watage = 5.0830, total flow = 21.0000, SFP = 0.2420)													
mechanical ventilation fans (SFP = 0.2420)													36.7721 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													111.7721 (231)
Electricity for lighting (calculated in Appendix L)													235.2969 (232)
Total delivered energy for all uses													2831.6242 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	958.6733	3.4800	33.3618	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1525.8819	3.4800	53.1007	(247)
Mechanical ventilation fans	36.7721	13.1900	4.8502	(249)
Pumps and fans for heating	75.0000	13.1900	9.8925	(249)
Energy for lighting	235.2969	13.1900	31.0357	(250)
Additional standing charges			120.0000	(251)
Total energy cost			252.2409	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.1079 (257)
SAP value		84.5442
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	958.6733	0.2160	207.0734	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1525.8819	0.2160	329.5905	(264)
Space and water heating			536.6639	(265)
Pumps and fans	111.7721	0.5190	58.0097	(267)
Energy for lighting	235.2969	0.5190	122.1191	(268)
Total kg/year			716.7927	(272)
CO2 emissions per m2			14.1600	(273)
EI value			89.9550	
EI rating			90	(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	$3.48 / 0.8816 = 3.948$, stars = 4
Water heating environmental impact	$0.216 / 0.8816 = 0.2450$, stars = 4

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Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

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

1. Overall dwelling dimensions

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	50.6200 (1b)	x 2.4600 (2b)	= 124.5252 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.6200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 124.5252 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 per hour
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)
Number of intermittent fans				0 * 10 =	0.0000 (7a)
Number of passive vents				0 * 10 =	0.0000 (7b)
Number of flueless gas fires				0 * 40 =	0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				0.0000 / (5) =	0.0000 (8)
Pressure test				Yes	
Measured/design AP50				5.0100	
Infiltration rate				0.2505	(18)
Number of sides sheltered				2	(19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.8500 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2129 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000 (22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750 (22a)
Adj infilt rate	0.2715	0.2502	0.2449	0.2289	0.2289	0.2129	0.2129	0.2076	0.2129	0.2395	0.2342	0.2502 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												0.5000 (23a)
Effective ac	0.5215	0.5002	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5002 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Windows (Uw = 1.40)			10.4500	1.3258	13.8542		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Clad	35.9900	10.4490	25.5410	0.2500	6.3853	61.0100	1558.2564 (29a)
Wl - To Corridor	3.9100	2.1170	1.7930	0.2499	0.4481	106.6200	191.1697 (29a)
Total net area of external elements Aum(A, m2)			39.9040				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	23.2315		(33)
Party Wall			32.0820	0.0000	0.0000	54.0300	1733.3905 (32)
Party Floor			50.6170			40.0000	2024.6800 (32d)
Party Ceiling			50.6170			70.0000	3543.1900 (32b)
1st Floor Stud			97.5784			5.8200	567.9061 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	9618.5926 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							190.0157 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.5486 (36)
Total fabric heat loss						(33) + (36) =	27.7801 (37)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	21.4293	20.5543	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5467	20.5543 (38)
Heat transfer coeff	49.2095	48.3345	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3268	48.3345 (39)
Average = Sum(39)m / 12 =												48.4016 (39)
HLP	0.9721	0.9548	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9547	0.9548 (40)
HLP (average)												0.9562 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												1.7084 (42)
Average daily hot water use (litres/day)												74.7737 (43)
Daily hot water use	82.2511	79.2601	76.2692	73.2782	70.2873	67.2963	67.2963	70.2873	73.2782	76.2692	79.2601	82.2511 (44)
Energy conte	121.9760	106.6810	110.0852	95.9749	92.0902	79.4669	73.6377	84.5004	85.5096	99.6532	108.7792	118.1272 (45)
Energy content (annual)												Total = Sum(45)m = 1176.4816 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

Distribution loss (46)m = 0.15 x (45)m	18.2964	16.0021	16.5128	14.3962	13.8135	11.9200	11.0457	12.6751	12.8264	14.9480	16.3169	17.7191 (46)
Water storage loss:												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	14.5179	13.0947	14.4688	13.9693	14.4111	13.9187	14.3656	14.3951	13.9463	14.4449	14.0170	14.5084 (61)
Total heat required for water heating calculated for each month	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356 (62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356 (64)
Heat gains from water heating, kWh/month	44.1865	38.7451	40.2205	35.4040	34.2228	29.9024	28.0759	31.6952	31.9185	36.7459	39.6733	42.9044 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	33.3087	29.5845	24.0597	18.2148	13.6158	11.4950	12.4207	16.1450	21.6697	27.5147	32.1137	34.2345 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	222.1554	224.4607	218.6514	206.2843	190.6730	176.0005	166.1985	163.8932	169.7024	182.0696	197.6809	212.3533 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347 (71)
Water heating gains (Table 5)	59.3904	57.6564	54.0598	49.1722	45.9984	41.5311	37.7365	42.6010	44.3313	49.3897	55.1019	57.6672 (72)
Total internal gains	398.9804	395.8275	380.8969	357.7972	334.4130	313.1526	300.4816	306.7650	319.8293	343.0998	369.0223	388.3809 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Northeast	4.8500	15.0428	0.5000	0.0000	0.7700	28.0887 (75)						
Southeast	5.5990	46.3896	0.5000	0.0000	0.7700	99.9981 (77)						
Solar gains	128.0868	194.6770	286.7640	399.0746	459.2444	508.6032	472.4576	417.4782	342.2997	233.8028	153.7460	103.5945 (83)
Total gains	527.0673	590.5044	667.6610	756.8717	793.6573	821.7558	772.9392	724.2433	662.1290	576.9026	522.7683	491.9754 (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	54.2951	55.2780	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867	55.2867
alpha	4.6197	4.6852	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6858	4.6852
util living area	0.9372	0.9027	0.8206	0.6744	0.5004	0.3281	0.2311	0.2466	0.4327	0.7032	0.8806	0.9473 (86)
MIT	20.3473	20.5056	20.7266	20.9030	20.9790	20.9976	20.9997	20.9995	20.9918	20.9068	20.6443	20.3220 (87)
Th 2	20.1066	20.1211	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1213	20.1211 (88)
util rest of house	0.9245	0.8849	0.7920	0.6336	0.4515	0.2772	0.1764	0.1882	0.3714	0.6524	0.8555	0.9362 (89)
MIT 2	19.5427	19.7033	19.9038	20.0521	20.1090	20.1203	20.1212	20.1212	20.1176	20.0595	19.8357	19.5317 (90)
Living area fraction	19.8981	20.0577	20.2672	20.4280	20.4933	20.5078	20.5092	20.5092	20.5037	20.4338	20.1929	19.8808 (92)
Temperature adjustment	19.7481	19.9077	20.1172	20.2780	20.3433	20.3578	20.3592	20.3592	20.3537	20.2838	20.0429	-0.1500
adjusted MIT												19.7308 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	484.1526	519.6985	528.6983	485.2607	368.2891	239.0681	147.7908	147.7705	256.7896	382.0443	445.9212	457.7404 (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	706.0631	686.7210	619.4159	516.0315	374.2080	239.5954	147.8423	147.8392	258.7280	409.9938	562.6630	687.8392 (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	165.1014	112.2391	67.4939	22.1550	4.4037	0.0000	0.0000	0.0000	0.0000	20.7944	84.0541	171.1935 (98)
Space heating												647.4352 (98)
Space heating per m2												12.7901 (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													715.3980 (211)
Space heating requirement	165.1014	112.2391	67.4939	22.1550	4.4037	0.0000	0.0000	0.0000	0.0000	20.7944	84.0541	171.1935	(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)	182.4325	124.0211	74.5789	24.4807	4.8660	0.0000	0.0000	0.0000	0.0000	22.9773	92.8775	189.1641	(211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating requirement	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356	(64)
Efficiency of water heater (217)m	89.0232	88.8193	88.3985	87.8208	87.4227	87.3000	87.3000	87.3000	87.3000	87.7785	88.5726	89.0747	(217)
Fuel for water heating, kWh/month	153.3240	134.8533	140.9006	125.1916	121.8234	106.9709	100.8056	113.2823	113.9243	129.9842	138.6390	148.9039	(219)
Water heating fuel used													1528.6029 (219)
Annual totals kWh/year													
Space heating fuel - main system													715.3980 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans: (MEVDecentralised, Database: total watage = 5.0830, total flow = 21.0000, SFP = 0.2420)													
mechanical ventilation fans (SFP = 0.2420)													36.7721 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													111.7721 (231)
Electricity for lighting (calculated in Appendix L)													235.2969 (232)
Total delivered energy for all uses													2591.0699 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	715.3980	3.8700	27.6859 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1528.6029	3.8700	59.1569 (247)
Mechanical ventilation fans	36.7721	18.9000	6.9499 (249)
Pumps and fans for heating	75.0000	18.9000	14.1750 (249)
Energy for lighting	235.2969	18.9000	44.4711 (250)
Additional standing charges			93.0000 (251)
Total energy cost			245.4389 (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	715.3980	0.2160	154.5260 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1528.6029	0.2160	330.1782 (264)
Space and water heating			484.7042 (265)
Pumps and fans	111.7721	0.5190	58.0097 (267)
Energy for lighting	235.2969	0.5190	122.1191 (268)
Total kg/year			664.8330 (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	715.3980	1.2200	872.7855 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1528.6029	1.2200	1864.8956 (264)
Space and water heating			2737.6811 (265)
Pumps and fans	111.7721	3.0700	343.1402 (267)
Energy for lighting	235.2969	3.0700	722.3615 (268)
Primary energy kWh/year			3803.1828 (272)
Primary energy kWh/m2/year			75.1320 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 85
Current environmental impact rating: B 90

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 90

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

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

	Current	Potential	Saving
Electricity	£66	£66	£0
Mains gas	£180	£180	£0
Space heating	£142	£142	£0
Water heating	£59	£59	£0
Lighting	£44	£44	£0
Total cost of fuels	£246	£246	£0
Total cost of uses	£245	£245	£0
Delivered energy	51 kWh/m ²	51 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	0.7 tonnes	0.7 tonnes	0.0 tonnes
CO2 emissions per m ²	13 kg/m ²	13 kg/m ²	0 kg/m ²
Primary energy	75 kWh/m ²	75 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	672 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	672	Prop Type Ref	Block B
Property	Plot 672		

SAP Rating	85 B	DER	15.76	TER	17.57
Environmental	90 B	% DER<TER	10.30		
CO₂ Emissions (t/year)	0.66	DFEE	33.67	TFEE	37.56
General Requirements Compliance	Pass	% DFEE<TFEE	10.35		

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)	17.57	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	15.76	kgCO ₂ /m ²	Pass
	-1.81 (-10.3%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	37.56	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	33.67	kWh/m ² /yr	
	-3.9 (-10.4%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.25 (max. 0.30)	0.25 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Openings	1.37 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

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

Limiting System Efficiencies

4 Heating efficiency

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

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



5 Cylinder insulation

Hot water storage

6 Controls

Space heating controls

Hot water controls

Boiler interlock

7 Low energy lights

Percentage of fixed lights with low-energy fittings %

Minimum %

8 Mechanical ventilation

Continuous extract system (decentralised)

Specific fan power

Maximum

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Southern England)

Based on:

Overshading

Windows facing North East

Windows facing South East

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.