

PREDICTED ENERGY ASSESSMENT

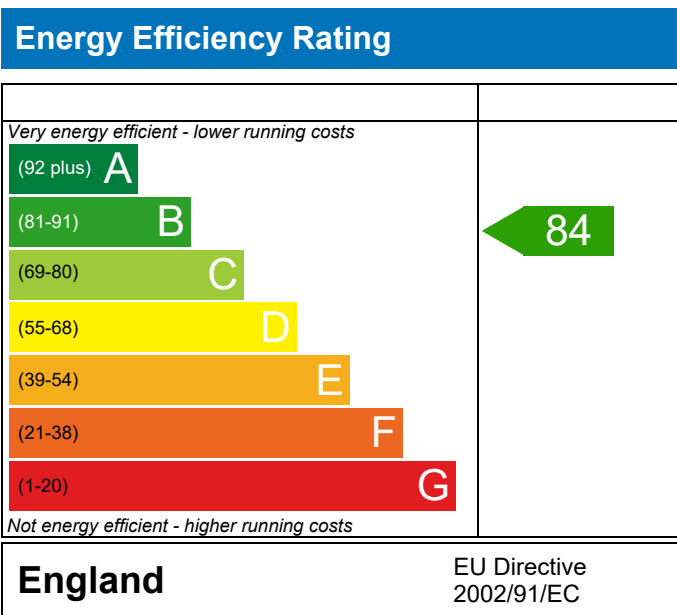


Plot 689

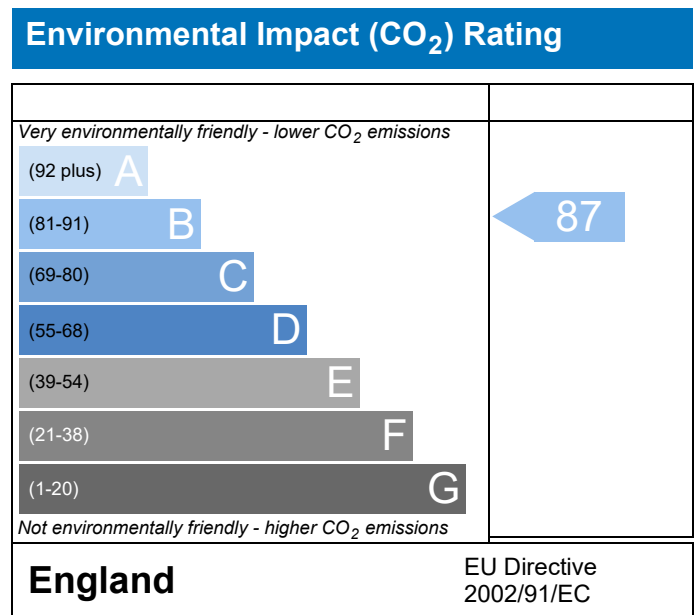
Dwelling type: Flat, End-Terrace
 Date of assessment: 26/02/2021
 Produced by: Michael Juckes
 Total floor area: 69.37 m²

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.



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	689 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	689	Prop Type Ref	Block B
Property	Plot 689		

SAP Rating	84 B	DER	17.21	TER	18.56
Environmental	87 B	% DER<TER	7.28		
CO ₂ Emissions (t/year)	0.99	DFEE	43.03	TFEE	49.20
General Requirements Compliance	Pass	% DFEE<TFEE	12.54		

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)	18.56	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	17.21	kgCO ₂ /m ²	Pass
	-1.35 (-7.3%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	49.20	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	43.03	kWh/m ² /yr	
	-6.2 (-12.6%)	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
Roof	0.11 (max. 0.20)	0.11 (max. 0.35)	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

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 West

7.06 m², No overhang

Windows facing North West

4.87 m², No overhang

Air change rate

4.21 ach

Blinds/curtains

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

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type

U-value

Filled Cavity with Edge Sealing

0.00

W/m²K

Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.01 (design value) m³/(h.m²) @ 50 Pa

Maximum

10.0 m³/(h.m²) @ 50 Pa

Pass

10 Key features

Party wall U-value

0.00

W/m²K

Roof U-value

0.11

W/m²K

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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	689 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	689	Prop Type Ref	Block B
Property	Plot 689		

SAP Rating	84 B	DER	17.21	TER	18.56
Environmental	87 B	% DER<TER	7.28		
CO ₂ Emissions (t/year)	0.99	DFEE	43.03	TTEE	49.20
General Requirements Compliance	Pass	% DFEE<TTEE	12.54		

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 2.4700 (2b)	= 171.3439 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	69.3700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 171.3439 (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													0.5000 (23a)
If mechanical ventilation:													
Effective ac	0.5454	0.5223	0.5165	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5107	0.5049	0.5223	(25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Windows (Uw = 1.40)			11.9400	1.3258	15.8163		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
W1 - Brick	44.9920	11.9360	33.0560	0.2600	8.5946	58.7400	1941.7094 (29a)
W1 - To Corridor	27.1700	2.1170	25.0530	0.2499	6.2610	106.6200	2671.1509 (29a)
RF - Ins Joist	69.3710		69.3710	0.1100	7.6308	5.8200	403.7392 (30)
Total net area of external elements Aum(A, m ²)			141.5300				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		40.8467		(33)
Party Wall			13.8690	0.0000	0.0000	54.0300	749.3421 (32)
Party Floor			69.3710			40.0000	2774.8400 (32d)
1st Floor Stud			135.1041			5.8200	786.3056 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		9327.0872 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							134.4542 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.0517 (36)
Total fabric heat loss					(33) + (36) =		47.8983 (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	30.8407	29.5305	29.2030	28.2717	28.2717	28.2717	28.2717	28.2717	28.2717	28.8754	28.5479	29.5305 (38)
Average = Sum(39)m / 12 =	78.7391	77.4289	77.1013	76.1701	76.1701	76.1701	76.1701	76.1701	76.1701	76.7738	76.4462	77.4289 (39)
	76.7449 (39)											
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1351	1.1162	1.1115	1.0980	1.0980	1.0980	1.0980	1.0980	1.0980	1.1067	1.1020	1.1162 (40)
Days in month												1.1063 (40)
	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	Total per year (kWh/year) = Sum(64)m =											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												
(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	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)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	44.9163	39.8942	32.4442	24.5623	18.3606	15.5008	16.7492	21.7712	29.2213	37.1031	43.3048	46.1646 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), 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)
Pumps, fans	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)
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)	-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)
Total internal gains	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)
	503.8893	499.8771	480.5891	450.7360	420.2938	392.9204	376.8476	384.5103	401.6215	431.6737	465.0764	490.2321 (73)

6. Solar gains

[Jan]		Area	Solar flux	g	FF	Access	Gains					
		m2	Table 6a	Specific data	Specific data	factor	W					
			W/m2	or Table 6b	or Table 6c	Table 6d						
Southwest		7.0620	46.3896	0.5000	0.0000	0.7700	126.1273 (79)					
Northwest		4.8740	15.0428	0.5000	0.0000	0.7700	28.2277 (81)					
Solar gains	154.3550	232.9339	339.0076	465.5340	530.9699	585.9883	545.1466	485.0101	402.4454	278.5576	184.9217	125.0620 (83)
Total gains	658.2443	732.8110	819.5967	916.2700	951.2637	978.9087	921.9941	869.5204	804.0669	710.2312	649.9981	615.2941 (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	32.9044	33.4611	33.6033	34.0141	34.0141	34.0141	34.0141	34.0141	34.0141	33.7466	33.8912	33.4611	
util living area	3.1936	3.2307	3.2402	3.2676	3.2676	3.2676	3.2676	3.2676	3.2676	3.2498	3.2594	3.2307	
MIT	0.9317	0.9070	0.8505	0.7447	0.5988	0.4190	0.3012	0.3186	0.5258	0.7626	0.8890	0.9402 (86)	
Th 2	19.6823	19.8798	20.2252	20.5972	20.8479	20.9644	20.9911	20.9895	20.9259	20.6442	20.1664	19.6608 (87)	
util rest of house	19.9723	19.9876	19.9915	20.0024	20.0024	20.0024	20.0024	20.0024	20.0024	19.9953	19.9992	19.9876 (88)	
MIT 2	0.9199	0.8918	0.8269	0.7073	0.5438	0.3500	0.2220	0.2351	0.4512	0.7165	0.8678	0.9296 (89)	
	18.8114	19.0124	19.3426	19.6901	19.9016	19.9852	19.9999	19.9994	19.9630	19.7354	19.3012	18.8033 (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	19.1736	19.3731	19.7097	20.0674	20.2951	20.3925	20.4121	20.4112	20.3635	20.1134	19.6610	19.1599 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.0236	19.2231	19.5597	19.9174	20.1451	20.2425	20.2621	20.2612	20.2135	19.9634	19.5110	19.0099 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9068	0.8784	0.8155	0.7039	0.5520	0.3670	0.2429	0.2571	0.4677	0.7148	0.8557	0.9171 (94)
Useful gains	596.8653	643.6819	668.3685	644.9679	525.0981	359.2315	223.9069	223.5135	376.0246	507.7071	556.1911	564.2688 (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	1072.7072	1047.0807	945.2354	785.8735	574.7131	368.8513	225.6246	225.5519	397.1093	626.7320	849.3958	1046.0571 (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	354.0264	271.0840	205.9890	101.4520	36.9136	0.0000	0.0000	0.0000	0.0000	88.5545	211.1074	358.4506 (98)
RHI space heating demand												1627.5775 (98)
												1628 (98)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	69.3700 (1b)	x 2.4700 (2b)	= 171.3439 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	69.3700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 171.3439 (5)

2. Ventilation rate

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	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 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)			11.9400	1.3258	15.8163		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Brick	44.9920	11.9360	33.0560	0.2600	8.5946	58.7400	1941.7094 (29a)
Wl - To Corridor	27.1700	2.1170	25.0530	0.2499	6.2610	106.6200	2671.1509 (29a)
Rf - Ins Joist	69.3710		69.3710	0.1100	7.6308	5.8200	403.7392 (30)
Total net area of external elements Aum(A, m ²)			141.5300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	40.8467		(33)
Party Wall			13.8690	0.0000	0.0000	54.0300	749.3421 (32)
Party Floor			69.3710			40.0000	2774.8400 (32d)
1st Floor Stud			135.1041			5.8200	786.3056 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	9327.0872 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							134.4542 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.0517 (36)
Total fabric heat loss						(33) + (36) =	47.8983 (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	30.8407	30.5132	30.1856	28.5479	28.2717	28.2717	28.2717	28.2717	28.2717	28.2717	28.8754	29.5305 (38)
Heat transfer coeff	78.7391	78.4115	78.0840	76.4462	76.1701	76.1701	76.1701	76.1701	76.1701	76.1701	76.7738	77.4289 (39)
Average = Sum(39)m / 12 =												76.9087 (39)
HLP	1.1351	1.1303	1.1256	1.1020	1.0980	1.0980	1.0980	1.0980	1.0980	1.0980	1.1067	1.1162 (40)
HLP (average)												1.1087 (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	44.9163	39.8942	32.4442	24.5623	18.3606	15.5008	16.7492	21.7712	29.2213	37.1031	43.3048	46.1646 (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	503.8893	499.8771	480.5891	450.7360	420.2938	392.9204	376.8476	384.5103	401.6215	431.6737	465.0764	490.2321 (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						
Southwest	7.0620	36.7938	0.5000	0.0000	0.7700	100.0376 (79)						
Northwest	4.8740	11.2829	0.5000	0.0000	0.7700	21.1723 (81)						
Solar gains	121.2100	213.4980	310.7971	416.4029	494.9845	503.9758	480.6551	420.1078	347.0663	240.9974	146.4623	102.9018 (83)
Total gains	625.0993	713.3751	791.3863	867.1390	915.2783	896.8962	857.5027	804.6181	748.6878	672.6710	611.5387	593.1339 (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	32.9044	33.0418	33.1804	33.8912	34.0141	34.0141	34.0141	34.0141	34.0141	34.0141	33.7466	33.4611
alpha	3.1936	3.2028	3.2120	3.2594	3.2676	3.2676	3.2676	3.2676	3.2676	3.2676	3.2498	3.2307
util living area	0.9489	0.9231	0.8777	0.7893	0.6601	0.5070	0.3796	0.4187	0.6175	0.8240	0.9228	0.9554 (86)
MIT	19.4536	19.7044	20.0598	20.4797	20.7743	20.9290	20.9791	20.9708	20.8630	20.4848	19.9139	19.4185 (87)
Th 2	19.9723	19.9761	19.9800	19.9992	20.0024	20.0024	20.0024	20.0024	20.0024	20.0024	19.9953	19.9876 (88)
util rest of house	0.9403	0.9106	0.8580	0.7568	0.6105	0.4386	0.2980	0.3343	0.5494	0.7891	0.9083	0.9478 (89)
MIT 2	18.5878	18.8337	19.1775	19.5834	19.8431	19.9632	19.9945	19.9907	19.9196	19.6010	19.0566	18.5653 (90)
Living area fraction	18.9479	19.1958	19.5444	19.9562	20.2303	20.3649	20.4040	20.3983	20.3119	19.9686	19.4131	18.9201 (92)
Temperature adjustment	18.7979	19.0458	19.3944	19.8062	20.0803	20.2149	20.2540	20.2483	20.1619	19.8186	19.2631	-0.1500
adjusted MIT	18.7979	19.0458	19.3944	19.8062	20.0803	20.2149	20.2540	20.2483	20.1619	19.8186	19.2631	18.7701 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9281	0.8971	0.8451	0.7500	0.6146	0.4537	0.3190	0.3556	0.5609	0.7818	0.8955	0.9364 (94)
Ext temp.	580.1810	639.9653	668.7720	650.3367	562.5576	406.9054	273.5298	286.1567	419.9488	525.9194	547.6346	555.4045 (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	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	1141.5498	1109.1939	1006.8460	833.7351	638.3320	427.6857	278.3260	293.1266	461.7372	702.1779	933.8098	1128.1496 (97)
Space heating per m2	417.6584	315.3216	251.5270	132.0469	56.3761	0.0000	0.0000	0.0000	0.0000	131.1364	278.0462	426.1223 (98)
(98) / (4) = 28.9496 (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													2219.0441 (211)
Space heating requirement	417.6584	315.3216	251.5270	132.0469	56.3761	0.0000	0.0000	0.0000	0.0000	131.1364	278.0462	426.1223	(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)	461.5010	348.4217	277.9304	145.9081	62.2941	0.0000	0.0000	0.0000	0.0000	144.9021	307.2333	470.8534	(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	89.6033	89.5035	89.3139	88.9091	88.2875	87.3000	87.3000	87.3000	87.3000	88.8738	89.3977	89.6347	(217)
Fuel for water heating, kWh/month	175.0380	153.7002	160.0082	141.6547	138.0155	122.1399	114.8619	129.4153	130.2530	147.0784	157.6522	169.9560	(219)
Water heating fuel used													1739.7734 (219)
Annual totals kWh/year													
Space heating fuel - main system													2219.0441 (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)													50.5975 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													125.5975 (231)
Electricity for lighting (calculated in Appendix L)													317.2942 (232)
Total delivered energy for all uses													4401.7092 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2219.0441	3.4800	77.2227	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1739.7734	3.4800	60.5441	(247)
Mechanical ventilation fans	50.5975	13.1900	6.6738	(249)
Pumps and fans for heating	75.0000	13.1900	9.8925	(249)
Energy for lighting	317.2942	13.1900	41.8511	(250)
Additional standing charges			120.0000	(251)
Total energy cost			316.1843	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200	(256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.1611	(257)
SAP value		83.8024	
SAP rating (Section 12)		84	(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	2219.0441	0.2160	479.3135	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1739.7734	0.2160	375.7911	(264)
Space and water heating			855.1046	(265)
Pumps and fans	125.5975	0.5190	65.1851	(267)
Energy for lighting	317.2942	0.5190	164.6757	(268)
Total kg/year			1084.9654	(272)
CO2 emissions per m2			15.6400	(273)
EI value			87.2882	
EI rating			87	(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	$3.48 / 0.8856 = 3.930$, stars = 4
Water heating environmental impact	$0.216 / 0.8856 = 0.2439$, stars = 4

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	69.3700 (1b)	x 2.4700 (2b)	= 171.3439 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	69.3700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 171.3439 (5)

2. Ventilation rate

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

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

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Windows (Uw = 1.40)			11.9400	1.3258	15.8163		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Brick	44.9920	11.9360	33.0560	0.2600	8.5946	58.7400	1941.7094 (29a)
Wl - To Corridor	27.1700	2.1170	25.0530	0.2499	6.2610	106.6200	2671.1509 (29a)
Rf - Ins Joist	69.3710		69.3710	0.1100	7.6308	5.8200	403.7392 (30)
Total net area of external elements Aum(A, m ²)			141.5300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	40.8467		(33)
Party Wall			13.8690	0.0000	0.0000	54.0300	749.3421 (32)
Party Floor			69.3710			40.0000	2774.8400 (32d)
1st Floor Stud			135.1041			5.8200	786.3056 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 9327.0872 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							134.4542 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.0517 (36)
Total fabric heat loss							(33) + (36) = 47.8983 (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	30.8407	29.5305	29.2030	28.2717	28.2717	28.2717	28.2717	28.2717	28.2717	28.8754	28.5479	29.5305 (38)
Heat transfer coeff	78.7391	77.4289	77.1013	76.1701	76.1701	76.1701	76.1701	76.1701	76.1701	76.7738	76.4462	77.4289 (39)
Average = Sum(39)m / 12 =												76.7449 (39)
HLP	1.1351	1.1162	1.1115	1.0980	1.0980	1.0980	1.0980	1.0980	1.0980	1.1067	1.1020	1.1162 (40)
HLP (average)												1.1063 (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	44.9163	39.8942	32.4442	24.5623	18.3606	15.5008	16.7492	21.7712	29.2213	37.1031	43.3048	46.1646 (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	503.8893	499.8771	480.5891	450.7360	420.2938	392.9204	376.8476	384.5103	401.6215	431.6737	465.0764	490.2321 (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						
Southwest	7.0620	46.3896	0.5000	0.0000	0.7700	126.1273 (79)						
Northwest	4.8740	15.0428	0.5000	0.0000	0.7700	28.2277 (81)						
Solar gains	154.3550	232.9339	339.0076	465.5340	530.9699	585.9883	545.1466	485.0101	402.4454	278.5576	184.9217	125.0620 (83)
Total gains	658.2443	732.8110	819.5967	916.2700	951.2637	978.9087	921.9941	869.5204	804.0669	710.2312	649.9981	615.2941 (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	32.9044	33.4611	33.6033	34.0141	34.0141	34.0141	34.0141	34.0141	34.0141	33.7466	33.8912	33.4611
alpha	3.1936	3.2307	3.2402	3.2676	3.2676	3.2676	3.2676	3.2676	3.2676	3.2498	3.2594	3.2307
util living area	0.9317	0.9070	0.8505	0.7447	0.5988	0.4190	0.3012	0.3186	0.5258	0.7626	0.8890	0.9402 (86)
MIT	19.6823	19.8798	20.2252	20.5972	20.8479	20.9644	20.9911	20.9895	20.9259	20.6442	20.1664	19.6608 (87)
Th 2	19.9723	19.9876	19.9915	20.0024	20.0024	20.0024	20.0024	20.0024	20.0024	19.9953	19.9992	19.9876 (88)
util rest of house	0.9199	0.8918	0.8269	0.7073	0.5438	0.3500	0.2220	0.2351	0.4512	0.7165	0.8678	0.9296 (89)
MIT 2	18.8114	19.0124	19.3426	19.6901	19.9016	19.9852	19.9999	19.9994	19.9630	19.7354	19.3012	18.8033 (90)
Living area fraction	19.1736	19.3731	19.7097	20.0674	20.2951	20.3925	20.4121	20.4112	20.3635	20.1134	19.6610	19.1599 (92)
Temperature adjustment	19.0236	19.2231	19.5597	19.9174	20.1451	20.2425	20.2621	20.2612	20.2135	19.9634	19.5110	-0.1500
adjusted MIT												19.0099 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9068	0.8784	0.8155	0.7039	0.5520	0.3670	0.2429	0.2571	0.4677	0.7148	0.8557	0.9171 (94)
Ext temp.	596.8653	643.6819	668.3685	644.9679	525.0981	359.2315	223.9069	223.5135	376.0246	507.7071	556.1911	564.2688 (95)
Heat loss rate W	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000 (96)
Month fracti	1072.7072	1047.0807	945.2354	785.8735	574.7131	368.8513	225.6246	225.5519	397.1093	626.7320	849.3958	1046.0571 (97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000 (97a)
Space heating per m2	354.0264	271.0840	205.9890	101.4520	36.9136	0.0000	0.0000	0.0000	0.0000	88.5545	211.1074	358.4506 (98)
												1627.5775 (98)
												(98) / (4) = 23.4623 (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													1798.4282 (211)
Space heating requirement	354.0264	271.0840	205.9890	101.4520	36.9136	0.0000	0.0000	0.0000	0.0000	88.5545	211.1074	358.4506	(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)	391.1894	299.5403	227.6122	112.1017	40.7885	0.0000	0.0000	0.0000	0.0000	97.8503	233.2678	396.0780	(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	89.4929	89.3969	89.1613	88.6993	88.0237	87.3000	87.3000	87.3000	87.3000	88.5647	89.1912	89.5213	(217)
Fuel for water heating, kWh/month	175.2540	153.8835	160.2819	141.9898	138.4292	122.1399	114.8619	129.4153	130.2530	147.5917	158.0173	170.1713	(219)
Water heating fuel used													1742.2887 (219)
Annual totals kWh/year													
Space heating fuel - main system													1798.4282 (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)													50.5975 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													125.5975 (231)
Electricity for lighting (calculated in Appendix L)													317.2942 (232)
Total delivered energy for all uses													3983.6086 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1798.4282	3.8700	69.5992 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1742.2887	3.8700	67.4266 (247)
Mechanical ventilation fans	50.5975	18.9000	9.5629 (249)
Pumps and fans for heating	75.0000	18.9000	14.1750 (249)
Energy for lighting	317.2942	18.9000	59.9686 (250)
Additional standing charges			93.0000 (251)
Total energy cost			313.7323 (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	1798.4282	0.2160	388.4605 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1742.2887	0.2160	376.3344 (264)
Space and water heating			764.7948 (265)
Pumps and fans	125.5975	0.5190	65.1851 (267)
Energy for lighting	317.2942	0.5190	164.6757 (268)
Total kg/year			994.6556 (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	1798.4282	1.2200	2194.0824 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1742.2887	1.2200	2125.5922 (264)
Space and water heating			4319.6746 (265)
Pumps and fans	125.5975	3.0700	385.5844 (267)
Energy for lighting	317.2942	3.0700	974.0931 (268)
Primary energy kWh/year			5679.3521 (272)
Primary energy kWh/m2/year			81.8704 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 84
Current environmental impact rating: B 87

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 84
 Potential environmental impact rating: B 87

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	£84	£84	£0
Mains gas	£230	£230	£0
Space heating	£186	£186	£0
Water heating	£67	£67	£0
Lighting	£60	£60	£0
Total cost of fuels	£314	£314	£0
Total cost of uses	£313	£313	£0
Delivered energy	57 kWh/m ²	57 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	1.0 tonnes	1.0 tonnes	0.0 tonnes
CO2 emissions per m ²	14 kg/m ²	14 kg/m ²	0 kg/m ²
Primary energy	82 kWh/m ²	82 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	689 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	689	Prop Type Ref	Block B
Property	Plot 689		

SAP Rating	84 B	DER	17.21	TER	18.56
Environmental	87 B	% DER<TER	7.28		
CO₂ Emissions (t/year)	0.99	DFEE	43.03	TFEE	49.20
General Requirements Compliance	Pass	% DFEE<TFEE	12.54		

Assessor Details	Mr. Michael Jukes, Michael Jukes, 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)	18.56	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	17.21	kgCO ₂ /m ²	Pass
	-1.35 (-7.3%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	49.20	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	43.03	kWh/m ² /yr	
	-6.2 (-12.6%)	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
Roof	0.11 (max. 0.20)	0.11 (max. 0.35)	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
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BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



Secondary heating system

None

5 Cylinder insulation

Hot water storage

No cylinder

6 Controls

Space heating controls

Programmer, room thermostat and TRVs

Pass

Hot water controls

No cylinder

Boiler interlock

Yes

Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100

%

Minimum

75

%

Pass

8 Mechanical ventilation

Continuous extract system (decentralised)

Specific fan power

0.1900 0.1800

Maximum

0.7

Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Southern England)

Slight

Pass

Based on:

Overshading

Average

Windows facing South West

7.06 m², No overhang

Windows facing North West

4.87 m², No overhang

Air change rate

4.21 ach

Blinds/curtains

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

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type

U-value

Filled Cavity with Edge Sealing

0.00

W/m²K

Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.01 (design value)

Maximum

10.0

Pass

10 Key features

Party wall U-value

0.00

W/m²K

Roof U-value

0.11

W/m²K

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