

PREDICTED ENERGY ASSESSMENT

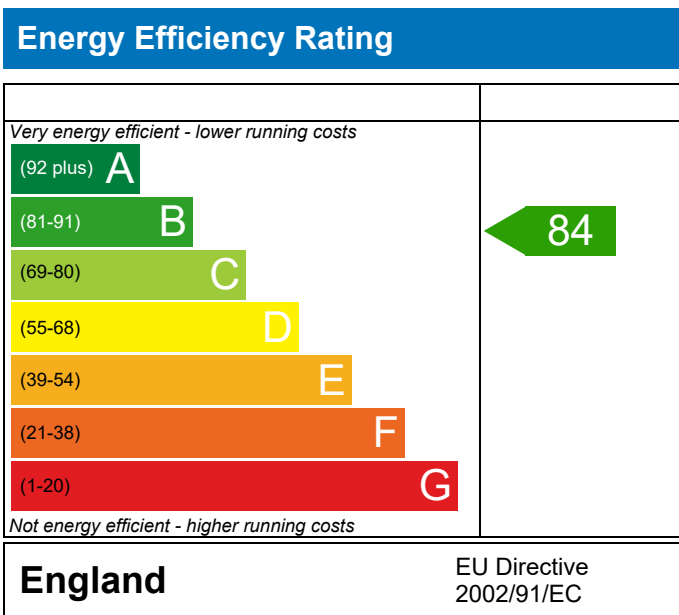


521 - PRJ009194 - MF

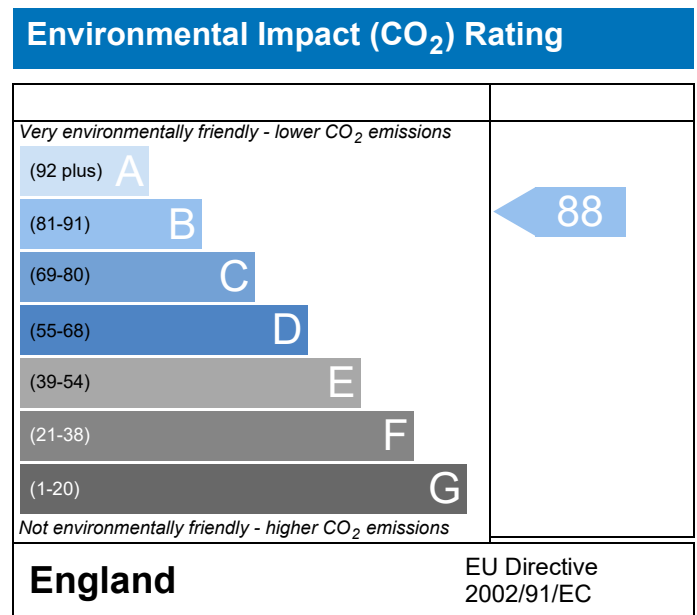
Dwelling type: Flat, End-Terrace
 Date of assessment: 26/02/2021
 Produced by: Michael Juckes
 Total floor area: 69.37 m²

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	521 - PRJ009194 - MF	Issued on Date	26/02/2021
Assessment Reference	521 E	Prop Type Ref	Block B - MF
Property	521 - PRJ009194 - MF		

SAP Rating	84 B	DER	16.68	TER	17.78
Environmental	88 B	% DER<TER	6.18		
CO ₂ Emissions (t/year)	0.94	DFEE	40.98	TFEE	45.17
General Requirements Compliance	Pass	% DFEE<TFEE	9.28		

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)	17.78	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	16.68	kgCO ₂ /m ²	Pass
	-1.10 (-6.2%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	45.17	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	40.98	kWh/m ² /yr	
	-4.2 (-9.3%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

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

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

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

Limiting System Efficiencies

4 Heating efficiency

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BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)



Main heating system

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

Pass

Secondary heating system

None

5 Cylinder insulation

Hot water storage

No cylinder

6 Controls

Space heating controls

Programmer, room thermostat and TRVs

Pass

Hot water controls

No cylinder

Boiler interlock

Yes

Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100 %

Minimum

75 %

Pass

8 Mechanical ventilation

Continuous extract system (decentralised)

Specific fan power

0.1900 0.1800

Maximum

0.7

Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Southern England)

Slight

Pass

Based on:

Overshading

Average

Windows facing North East

7.28 m², No overhang

Windows facing North West

4.95 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

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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	521 - PRJ009194 - MF	Issued on Date	26/02/2021
Assessment Reference	521 E	Prop Type Ref	Block B - MF
Property	521 - PRJ009194 - MF		

SAP Rating	84 B	DER	16.68	TER	17.78
Environmental	88 B	% DER<TER	6.18		
CO ₂ Emissions (t/year)	0.94	DFEE	40.98	TTEE	45.17
General Requirements Compliance	Pass	% DFEE<TTEE	9.28		

Assessor Details	Mr. Michael Juckes, Michael Juckes, Tel: 02033971373, michael@briaryenergy.co.uk	Assessor ID	T850-0001
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Client	
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CALCULATION OF HEAT DEMAND 09 Jan 2014

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

1. Overall dwelling dimensions

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

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour								
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)								
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)								
Number of intermittent fans				0 * 10 =	0.0000 (7a)								
Number of passive vents				0 * 10 =	0.0000 (7b)								
Number of flueless gas fires				0 * 40 =	0.0000 (7c)								
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				Air changes per hour	0.0000 / (5) = 0.0000 (8)								
Pressure test				Yes									
Measured/design AP50				5.0100									
Infiltration rate				0.2505	(18)								
Number of sides sheltered				1	(19)								
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.9250 (20)								
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2317 (21)								
Wind speed	Jan 5.1000	Feb 4.7000	Mar 4.6000	Apr 4.3000	May 4.3000	Jun 4.0000	Jul 4.0000	Aug 3.9000	Sep 4.0000	Oct 4.5000	Nov 4.4000	Dec 4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infiltr 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)			12.2200	1.3258	16.2140		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
W1 - Brick	44.8110	12.2200	32.5910	0.2600	8.4737	58.7400	1914.3953 (29a)
W1 - To Corridor	27.0600	2.1170	24.9430	0.2499	6.2335	106.6200	2659.4227 (29a)
Total net area of external elements Aum(A, m ²)			71.8840				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	33.4652			(33)
Party Wall			13.8130	0.0000	0.0000	54.0300	746.3164 (32)
Party Floor			69.3710			40.0000	2774.8400 (32d)
Party Ceiling			69.3710			70.0000	4855.9700 (32b)
1st Floor Stud			134.5571			5.8200	783.1222 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	13734.0666 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							197.9828 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.8722 (36)
Total fabric heat loss						(33) + (36) =	39.3373 (37)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	30.7158	29.4110	29.0847	28.1573	28.1573	28.1573	28.1573	28.1573	28.1573	28.7585	28.4323	29.4110 (38)
Heat transfer coeff	70.0532	68.7483	68.4221	67.4946	67.4946	67.4946	67.4946	67.4946	67.4946	68.0959	67.7697	68.7483 (39)
Average = Sum(39)m / 12 =												68.0671 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.0098	0.9910	0.9863	0.9730	0.9730	0.9730	0.9730	0.9730	0.9730	0.9816	0.9769	0.9910 (40)
HLP (average)												0.9812 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.2307 (42)

Average daily hot water use (litres/day) 87.1799 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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 content (annual)	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)
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												
Combi loss	14.6261	13.1859	14.5593	14.0451	14.4809	13.9764	14.4190	14.4591	14.0138	14.5269	14.1099	14.6131 (61)
Total heat required for water heating calculated for each month	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (64)
RHI water heating demand												1542.6949 (64)
Heat gains from water heating, kWh/month	50.9426	44.6532	46.3163	40.7176	39.3206	34.3008	32.1517	36.3728	36.6527	42.2640	45.6976	49.4473 (65)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	44.7344	39.7327	32.3128	24.4629	18.2863	15.4380	16.6813	21.6831	29.1029	36.9529	43.1295	45.9777 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	292.2720	295.3049	287.6621	271.3917	250.8531	231.5498	218.6540	215.6211	223.2638	239.5343	260.0728	279.3762 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293 (71)
Water heating gains (Table 5)	68.4712	66.4482	62.2530	56.5523	52.8503	47.6400	43.2146	48.8882	50.9066	56.8064	63.4689	66.4615 (72)
Total internal gains	503.7074	499.7155	480.4577	450.6366	420.2194	392.8576	376.7797	384.4221	401.5031	431.5234	464.9010	490.0451 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b g	Specific data or Table 6c FF	Access factor Table 6d	Gains W						
Northeast	7.2750	15.0428	0.5000	0.0000	0.7700	42.1331 (75)						
Northwest	4.9450	15.0428	0.5000	0.0000	0.7700	28.6389 (81)						
Solar gains	70.7720	123.9551	222.9850	371.6985	474.4693	545.6070	498.9345	408.4228	287.9437	160.5739	88.4347	55.0548 (83)
Total gains	574.4794	623.6706	703.4427	822.3350	894.6887	938.4647	875.7142	792.8449	689.4469	592.0973	553.3357	545.0999 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	54.4589	55.4925	55.7571	56.5233	56.5233	56.5233	56.5233	56.5233	56.5233	56.0242	56.2939	55.4925
alpha	4.6306	4.6995	4.7171	4.7682	4.7682	4.7682	4.7682	4.7682	4.7682	4.7349	4.7529	4.6995
util living area	0.9752	0.9632	0.9201	0.7981	0.6053	0.3996	0.2847	0.3141	0.5673	0.8481	0.9512	0.9786 (86)
MIT	20.1098	20.2428	20.5125	20.8093	20.9572	20.9950	20.9992	20.9988	20.9766	20.7909	20.4484	20.1067 (87)
Th 2	20.0751	20.0908	20.0947	20.1059	20.1059	20.1059	20.1059	20.1059	20.1059	20.0987	20.1026	20.0908 (88)
util rest of house												
MIT 2	0.9690	0.9544	0.9019	0.7603	0.5493	0.3372	0.2161	0.2387	0.4905	0.8058	0.9375	0.9732 (89)
MIT 2	19.2873	19.4293	19.6898	19.9646	20.0804	20.1039	20.1058	20.1057	20.0951	19.9507	19.6407	19.2975 (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	19.6294	19.7676	20.0319	20.3159	20.4450	20.4745	20.4773	20.4771	20.4617	20.3001	19.9766	19.6341 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.4794	19.6176	19.8819	20.1659	20.2950	20.3245	20.3273	20.3271	20.3117	20.1501	19.8266	19.4841 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9641	0.9490	0.8970	0.7630	0.5615	0.3525	0.2332	0.2574	0.5087	0.8085	0.9325	0.9687 (94)
Useful gains	553.8625	591.8370	630.9920	627.4694	502.3403	330.8514	204.1775	204.0780	350.7189	478.7163	515.9586	528.0242 (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	986.3039	956.8139	860.8809	713.1405	519.3720	332.3768	204.3294	204.3141	358.5117	568.6073	774.3761	961.3806 (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	321.7364	245.2645	171.0374	61.6831	12.6715	0.0000	0.0000	0.0000	0.0000	66.8789	186.0606	322.4171 (98)
RHI space heating demand												1387.7496 (98)
												1388 (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 2.4600 (2b)	= 170.6502 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	69.3700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 170.6502 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)
Number of intermittent fans				0 * 10 =	0.0000 (7a)
Number of passive vents				0 * 10 =	0.0000 (7b)
Number of flueless gas fires				0 * 40 =	0.0000 (7c)
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 (U _w = 1.40)			12.2200	1.3258	16.2140		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Brick	44.8110	12.2200	32.5910	0.2600	8.4737	58.7400	1914.3953 (29a)
Wl - To Corridor	27.0600	2.1170	24.9430	0.2499	6.2335	106.6200	2659.4227 (29a)
Total net area of external elements A _{um} (m ²)			71.8840				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	33.4652		(33)
Party Wall			13.8130	0.0000	0.0000	54.0300	746.3164 (32)
Party Floor			69.3710			40.0000	2774.8400 (32d)
Party Ceiling			69.3710			70.0000	4855.9700 (32b)
1st Floor Stud			134.5571			5.8200	783.1222 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	13734.0666 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							197.9828 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.8722 (36)
Total fabric heat loss						(33) + (36) =	39.3373 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	30.7158	30.3896	30.0634	28.4323	28.1573	28.1573	28.1573	28.1573	28.1573	28.1573	28.7585	29.4110 (38)
Heat transfer coeff	70.0532	69.7270	69.4008	67.7697	67.4946	67.4946	67.4946	67.4946	67.4946	67.4946	68.0959	68.7483 (39)
Average = Sum(39)m / 12 =												68.2302 (39)
HLP	1.0098	1.0051	1.0004	0.9769	0.9730	0.9730	0.9730	0.9730	0.9730	0.9730	0.9816	0.9910 (40)
HLP (average)												0.9836 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.2307 (42)
Average daily hot water use (litres/day)												87.1799 (43)
Daily hot water use	95.8979	92.4107	88.9235	85.4363	81.9491	78.4619	78.4619	81.9491	85.4363	88.9235	92.4107	95.8979 (44)
Energy conte	142.2138	124.3811	128.3502	111.8988	107.3695	92.6518	85.8555	98.5204	99.6971	116.1873	126.8275	137.7265 (45)
Energy content (annual)												Total = Sum(45)m = 1371.6794 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

Distribution loss (46)m = 0.15 x (45)m	21.3321	18.6572	19.2525	16.7848	16.1054	13.8978	12.8783	14.7781	14.9546	17.4281	19.0241	20.6590 (46)
Water storage loss:												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	14.6261	13.1859	14.5593	14.0451	14.4809	13.9764	14.4190	14.4591	14.0138	14.5269	14.1099	14.6131 (61)
Total heat required for water heating calculated for each month	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (64)
Heat gains from water heating, kWh/month	50.9426	44.6532	46.3163	40.7176	39.3206	34.3008	32.1517	36.3728	36.6527	42.2640	45.6976	49.4473 (65)
Solar input (sum of months) = Sum(63)m = 0.0000 (63)												
Total per year (kWh/year) = Sum(64)m = 1542.6949 (64)												

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	44.7344	39.7327	32.3128	24.4629	18.2863	15.4380	16.6813	21.6831	29.1029	36.9529	43.1295	45.9777 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	292.2720	295.3049	287.6621	271.3917	250.8531	231.5498	218.6540	215.6211	223.2638	239.5343	260.0728	279.3762 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293 (71)
Water heating gains (Table 5)	68.4712	66.4482	62.2530	56.5523	52.8503	47.6400	43.2146	48.8882	50.9066	56.8064	63.4689	66.4615 (72)
Total internal gains	503.7074	499.7155	480.4577	450.6366	420.2194	392.8576	376.7797	384.4221	401.5031	431.5234	464.9010	490.0451 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Northeast	7.2750	11.2829	0.5000	0.0000	0.7700	31.6021 (75)						
Northwest	4.9450	11.2829	0.5000	0.0000	0.7700	21.4807 (81)						
Solar gains	53.0829	108.0517	194.6748	319.7119	429.7555	458.1649	428.6038	341.6880	237.2143	132.0477	66.7920	43.3501 (83)
Total gains	556.7903	607.7672	675.1325	770.3485	849.9750	851.0225	805.3836	726.1101	638.7174	563.5711	531.6930	533.3953 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation factor for gains for living area, nil,m (see Table 9a)	54.4589	54.7137	54.9708	56.2939	56.5233	56.5233	56.5233	56.5233	56.5233	56.5233	56.0242	55.4925
tau	4.6306	4.6476	4.6647	4.7529	4.7682	4.7682	4.7682	4.7682	4.7682	4.7682	4.7349	4.6995
alpha	0.9829	0.9727	0.9429	0.8509	0.6834	0.4975	0.3667	0.4233	0.6769	0.9037	0.9704	0.9856 (86)
util living area	19.9593	20.1108	20.3807	20.7230	20.9211	20.9856	20.9973	20.9947	20.9438	20.6753	20.2757	19.9437 (87)
MIT	20.0751	20.0790	20.0830	20.1026	20.1059	20.1059	20.1059	20.1059	20.1059	20.1059	20.0987	20.0908 (88)
Th 2	0.9788	0.9662	0.9296	0.8201	0.6317	0.4319	0.2932	0.3431	0.6061	0.8756	0.9622	0.9821 (89)
util rest of house	19.1389	19.2907	19.5552	19.8880	20.0547	20.0991	20.1051	20.1042	20.0751	19.8562	19.4703	19.1363 (90)
Living area fraction	19.4801	19.6318	19.8985	20.2353	20.4150	20.4678	20.4761	20.4746	20.4364	20.1969	19.8053	19.4721 (92)
MIT	19.3301	19.4818	19.7485	20.0853	20.2650	20.3178	20.3261	20.3246	20.2864	20.0469	19.6553	19.3221 (93)
Temperature adjustment adjusted MIT												-0.1500
flA = Living area / (4) =												0.4159 (91)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9746	0.9611	0.9239	0.8194	0.6413	0.4477	0.3114	0.3629	0.6211	0.8734	0.9573	0.9784 (94)
Ext temp.	542.6716	584.1059	623.7261	631.2588	545.0944	381.0086	250.8214	263.5099	396.7020	492.2462	508.9945	521.8535 (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	1052.9088	1016.7416	919.4571	758.0223	578.0914	385.9181	251.4948	264.8873	417.5476	637.6118	854.9613	1039.6209 (97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000 (97a)
Space heating per m2	379.6164	290.7312	220.0239	91.2698	24.5498	0.0000	0.0000	0.0000	0.0000	108.1520	249.0961	385.2189 (98)
(98) / (4) =												25.2077 (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													1932.2188 (211)
Space heating requirement	379.6164	290.7312	220.0239	91.2698	24.5498	0.0000	0.0000	0.0000	0.0000	108.1520	249.0961	385.2189	(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)	419.4656	321.2499	243.1203	100.8506	27.1268	0.0000	0.0000	0.0000	0.0000	119.5049	275.2443	425.6563	(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	89.5404	89.4469	89.2124	88.6166	87.8207	87.3000	87.3000	87.3000	87.3000	88.7204	89.3170	89.5696	(217)
Fuel for water heating, kWh/month	175.1609	153.7974	160.1902	142.1222	138.7491	122.1399	114.8619	129.4153	130.2530	147.3327	157.7947	170.0797	(219)
Water heating fuel used													1741.8971 (219)
Annual totals kWh/year													
Space heating fuel - main system													1932.2188 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans: (MEVDecentralised, Database: total watage = 5.0830, total flow = 21.0000, SFP = 0.2420)													
mechanical ventilation fans (SFP = 0.2420)													50.3927 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													125.3927 (231)
Electricity for lighting (calculated in Appendix L)													316.0093 (232)
Total delivered energy for all uses													4115.5178 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1932.2188	3.4800	67.2412	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1741.8971	3.4800	60.6180	(247)
Mechanical ventilation fans	50.3927	13.1900	6.6468	(249)
Pumps and fans for heating	75.0000	13.1900	9.8925	(249)
Energy for lighting	316.0093	13.1900	41.6816	(250)
Additional standing charges			120.0000	(251)
Total energy cost			306.0801	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.1240 (257)
SAP value		84.3200
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	1932.2188	0.2160	417.3593	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1741.8971	0.2160	376.2498	(264)
Space and water heating			793.6090	(265)
Pumps and fans	125.3927	0.5190	65.0788	(267)
Energy for lighting	316.0093	0.5190	164.0088	(268)
Total kg/year			1022.6966	(272)
CO2 emissions per m2			14.7400	(273)
EI value			88.0177	
EI rating			88	(274)
EI band			B	

Calculation of stars for heating and DHW

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.9050 = 3.845$, stars = 4
Main heating environmental impact	$0.216 \times (1 + 0.29 \times 0.00) / 0.9050 = 0.2387$, stars = 4
Water heating energy efficiency	$3.48 / 0.8845 = 3.934$, stars = 4
Water heating environmental impact	$0.216 / 0.8845 = 0.2442$, stars = 4

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

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

1. Overall dwelling dimensions

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

2. Ventilation rate

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

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

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Windows (Uw = 1.40)			12.2200	1.3258	16.2140		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Brick	44.8110	12.2200	32.5910	0.2600	8.4737	58.7400	1914.3953 (29a)
Wl - To Corridor	27.0600	2.1170	24.9430	0.2499	6.2335	106.6200	2659.4227 (29a)
Total net area of external elements Aum(A, m2)			71.8840				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	33.4652		(33)
Party Wall			13.8130	0.0000	0.0000	54.0300	746.3164 (32)
Party Floor			69.3710			40.0000	2774.8400 (32d)
Party Ceiling			69.3710			70.0000	4855.9700 (32b)
1st Floor Stud			134.5571			5.8200	783.1222 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	13734.0666 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							197.9828 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							5.8722 (36)
Total fabric heat loss						(33) + (36) =	39.3373 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	30.7158	29.4110	29.0847	28.1573	28.1573	28.1573	28.1573	28.1573	28.1573	28.7585	28.4323	29.4110 (38)
Heat transfer coeff	70.0532	68.7483	68.4221	67.4946	67.4946	67.4946	67.4946	67.4946	67.4946	68.0959	67.7697	68.7483 (39)
Average = Sum(39)m / 12 =												68.0671 (39)
HLP	1.0098	0.9910	0.9863	0.9730	0.9730	0.9730	0.9730	0.9730	0.9730	0.9816	0.9769	0.9910 (40)
HLP (average)												0.9812 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.2307 (42)
Average daily hot water use (litres/day)												87.1799 (43)
Daily hot water use	95.8979	92.4107	88.9235	85.4363	81.9491	78.4619	78.4619	81.9491	85.4363	88.9235	92.4107	95.8979 (44)
Energy conte	142.2138	124.3811	128.3502	111.8988	107.3695	92.6518	85.8555	98.5204	99.6971	116.1873	126.8275	137.7265 (45)
Energy content (annual)										Total = Sum(45)m =		1371.6794 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

Distribution loss (46)m = 0.15 x (45)m	21.3321	18.6572	19.2525	16.7848	16.1054	13.8978	12.8783	14.7781	14.9546	17.4281	19.0241	20.6590 (46)
Water storage loss:												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	14.6261	13.1859	14.5593	14.0451	14.4809	13.9764	14.4190	14.4591	14.0138	14.5269	14.1099	14.6131 (61)
Total heat required for water heating calculated for each month	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	156.8399	137.5670	142.9095	125.9439	121.8504	106.6281	100.2745	112.9795	113.7109	130.7142	140.9374	152.3396 (64)
Heat gains from water heating, kWh/month	50.9426	44.6532	46.3163	40.7176	39.3206	34.3008	32.1517	36.3728	36.6527	42.2640	45.6976	49.4473 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440	133.8440 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	44.7344	39.7327	32.3128	24.4629	18.2863	15.4380	16.6813	21.6831	29.1029	36.9529	43.1295	45.9777 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	292.2720	295.3049	287.6621	271.3917	250.8531	231.5498	218.6540	215.6211	223.2638	239.5343	260.0728	279.3762 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151	50.6151 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293	-89.2293 (71)
Water heating gains (Table 5)	68.4712	66.4482	62.2530	56.5523	52.8503	47.6400	43.2146	48.8882	50.9066	56.8064	63.4689	66.4615 (72)
Total internal gains	503.7074	499.7155	480.4577	450.6366	420.2194	392.8576	376.7797	384.4221	401.5031	431.5234	464.9010	490.0451 (73)

6. Solar gains

[Jan]	Area	Solar flux	g	FF	Access	Gains
	m2	Table 6a	Specific data	Specific data	factor	W
		W/m2	or Table 6b	or Table 6c	Table 6d	
Northeast	7.2750	15.0428	0.5000	0.0000	0.7700	42.1331 (75)
Northwest	4.9450	15.0428	0.5000	0.0000	0.7700	28.6389 (81)
Solar gains	70.7720	123.9551	222.9850	371.6985	474.4693	545.6070
Total gains	574.4794	623.6706	703.4427	822.3350	894.6887	938.4647

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	54.4589	55.4925	55.7571	56.5233	56.5233	56.5233	56.5233	56.5233	56.5233	56.0242	56.2939	55.4925
alpha	4.6306	4.6995	4.7171	4.7682	4.7682	4.7682	4.7682	4.7682	4.7682	4.7349	4.7529	4.6995
util living area	0.9752	0.9632	0.9201	0.7981	0.6053	0.3996	0.2847	0.3141	0.5673	0.8481	0.9512	0.9786 (86)
MIT	20.1098	20.2428	20.5125	20.8093	20.9572	20.9950	20.9992	20.9988	20.9766	20.7909	20.4484	20.1067 (87)
Th 2	20.0751	20.0908	20.0947	20.1059	20.1059	20.1059	20.1059	20.1059	20.1059	20.0987	20.1026	20.0908 (88)
util rest of house	0.9690	0.9544	0.9019	0.7603	0.5493	0.3372	0.2161	0.2387	0.4905	0.8058	0.9375	0.9732 (89)
MIT 2	19.2873	19.4293	19.6898	19.9646	20.0804	20.1039	20.1058	20.1057	20.0951	19.9507	19.6407	19.2975 (90)
Living area fraction	19.6294	19.7676	20.0319	20.3159	20.4450	20.4745	20.4773	20.4771	20.4617	20.3001	19.9766	19.6341 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.4794	19.6176	19.8819	20.1659	20.2950	20.3245	20.3273	20.3271	20.3117	20.1501	19.8266	19.4841 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9641	0.9490	0.8970	0.7630	0.5615	0.3525	0.2332	0.2574	0.5087	0.8085	0.9325	0.9687 (94)
Ext temp.	553.8625	591.8370	630.9920	627.4694	502.3403	330.8514	204.1775	204.0780	350.7189	478.7163	515.9586	528.0242 (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	986.3039	956.8139	860.8809	713.1405	519.3720	332.3768	204.3294	204.3141	358.5117	568.6073	774.3761	961.3806 (97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000 (97a)
Space heating per m2	321.7364	245.2645	171.0374	61.6831	12.6715	0.0000	0.0000	0.0000	0.0000	66.8789	186.0606	322.4171 (98)
												1387.7496 (98)
												(98) / (4) = 20.0050 (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													1533.4250 (211)
Space heating requirement	321.7364	245.2645	171.0374	61.6831	12.6715	0.0000	0.0000	0.0000	0.0000	66.8789	186.0606	322.4171	(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)	355.5098	271.0105	188.9916	68.1582	14.0017	0.0000	0.0000	0.0000	0.0000	73.8993	205.5919	356.2620	(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	89.4258	89.3235	89.0147	88.3268	87.5917	87.3000	87.3000	87.3000	87.3000	88.3575	89.0925	89.4479	(216)
Fuel for water heating, kWh/month	175.3856	154.0100	160.5459	142.5886	139.1118	122.1399	114.8619	129.4153	130.2530	147.9379	158.1923	170.3110	(219)
Water heating fuel used													1744.7531 (219)
Annual totals kWh/year													
Space heating fuel - main system													1533.4250 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans: (MEVDecentralised, Database: total watage = 5.0830, total flow = 21.0000, SFP = 0.2420)													
mechanical ventilation fans (SFP = 0.2420)													50.3927 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													125.3927 (231)
Electricity for lighting (calculated in Appendix L)													316.0093 (232)
Total delivered energy for all uses													3719.5800 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1533.4250	3.8700	59.3435 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1744.7531	3.8700	67.5219 (247)
Mechanical ventilation fans	50.3927	18.9000	9.5242 (249)
Pumps and fans for heating	75.0000	18.9000	14.1750 (249)
Energy for lighting	316.0093	18.9000	59.7257 (250)
Additional standing charges			93.0000 (251)
Total energy cost			303.2905 (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	1533.4250	0.2160	331.2198 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1744.7531	0.2160	376.8667 (264)
Space and water heating			708.0865 (265)
Pumps and fans	125.3927	0.5190	65.0788 (267)
Energy for lighting	316.0093	0.5190	164.0088 (268)
Total kg/year			937.1741 (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	1533.4250	1.2200	1870.7784 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1744.7531	1.2200	2128.5988 (264)
Space and water heating			3999.3772 (265)
Pumps and fans	125.3927	3.0700	384.9555 (267)
Energy for lighting	316.0093	3.0700	970.1484 (268)
Primary energy kWh/year			5354.4812 (272)
Primary energy kWh/m2/year			77.1873 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 84
 Current environmental impact rating: B 88

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

(For testing purposes):

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

Recommended measures: (none)	SAP change	Cost change	CO2 change
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Recommended measures (none)	Typical annual savings	Energy efficiency	Environmental impact
	Total Savings £0		0.00 kg/m ²

Potential energy efficiency rating: B 84
 Potential environmental impact rating: B 88

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

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

	Current	Potential	Saving
Electricity	£83	£83	£0
Mains gas	£220	£220	£0
Space heating	£176	£176	£0
Water heating	£68	£68	£0
Lighting	£60	£60	£0
Total cost of fuels	£303	£303	£0
Total cost of uses	£304	£304	£0
Delivered energy	54 kWh/m ²	54 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	0.9 tonnes	0.9 tonnes	0.0 tonnes
CO2 emissions per m ²	14 kg/m ²	14 kg/m ²	0 kg/m ²
Primary energy	77 kWh/m ²	77 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	521 - PRJ009194 - MF		Issued on Date	26/02/2021	
Assessment Reference	521 E	Prop Type Ref	Block B - MF		
Property	521 - PRJ009194 - MF				
SAP Rating	84 B	DER	16.68	TER	17.78
Environmental	88 B	% DER<TER	6.18		
CO₂ Emissions (t/year)	0.94	DFEE	40.98	TFEE	45.17
General Requirements Compliance	Pass	% DFEE<TFEE	9.28		
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)	17.78	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	16.68	kgCO ₂ /m ²	Pass
	-1.10 (-6.2%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	45.17	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	40.98	kWh/m ² /yr	
	-4.2 (-9.3%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

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

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

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

Limiting System Efficiencies

4 Heating efficiency

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

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



5 Cylinder insulation

Hot water storage

6 Controls

Space heating controls

Hot water controls

Boiler interlock

7 Low energy lights

Percentage of fixed lights with low-energy fittings %

Minimum %

8 Mechanical ventilation

Continuous extract system (decentralised)

Specific fan power

Maximum

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Southern England)

Based on:

Overshading

Windows facing North East

Windows facing North West

Air change rate

Blinds/curtains

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

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

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

Maximum

10 Key features

Party wall U-value W/m²K

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