

PREDICTED ENERGY ASSESSMENT



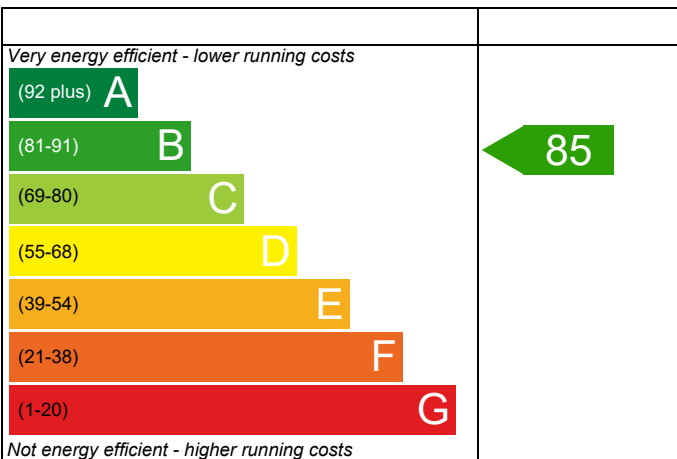
Plot 94

Dwelling type: House, End-Terrace
 Date of assessment: 27/04/2021
 Produced by: Michael Juckes
 Total floor area: 83.56 m²

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

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

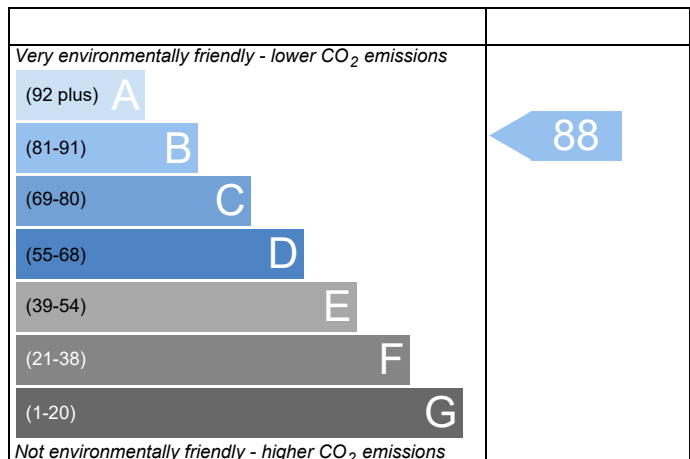
Energy Efficiency Rating



England EU Directive 2002/91/EC

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

Environmental Impact (CO₂) Rating



England EU Directive 2002/91/EC

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

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

BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)



Property Reference	094 - PRJ011661		Issued on Date	27/04/2021	
Assessment Reference	094 M	Prop Type Ref	Sorley		
Property	Plot 94				
SAP Rating	85 B	DER	15.63	TER	16.98
Environmental	88 B	% DER<TER	7.96		
CO ₂ Emissions (t/year)	1.15	DFEE	34.97	TFEE	43.28
General Requirements Compliance	Pass	% DFEE<TFEE	19.21		
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 TFE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	16.98	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	15.63	kgCO ₂ /m ²	Pass
	-1.35 (-8.0%)	kgCO ₂ /m ²	

1b TFE and DFEE

Target Fabric Energy Efficiency (TFEE)	43.28	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	34.97	kWh/m ² /yr	
	-8.3 (-19.2%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.24 (max. 0.30)	0.24 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.19 (max. 0.25)	0.19 (max. 0.70)	Pass
Roof	0.10 (max. 0.20)	0.10 (max. 0.35)	Pass
Openings	1.28 (max. 2.00)	1.30 (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 35
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

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Midlands)

Not significant

Pass

Based on:

Overshading

Average

Windows facing North

4.05 m², No overhang

Windows facing South

3.86 m², No overhang

Air change rate

4.00 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

0.10 W/m²K

Thermal bridging y-value

0.037 W/m²K

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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	094 - PRJ011661	Issued on Date	27/04/2021
Assessment Reference	094 M	Prop Type Ref	Sorley
Property	Plot 94		

SAP Rating	85 B	DER	15.63	TER	16.98
Environmental	88 B	% DER<TER	7.96		
CO ₂ Emissions (t/year)	1.15	DFEE	34.97	TTEE	43.28
General Requirements Compliance	Pass	% DFEE<TTEE	19.21		

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	41.7800 (1b)	x 2.3300 (2b)	= 97.3474 (1b) - (3b)
First floor	41.7800 (1c)	x 2.5300 (2c)	= 105.7034 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	83.5600		(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 203.0508 (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				4 * 10 =	40.0000 (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)				40.0000 / (5) =	0.1970 (8)							
Pressure test				Yes								
Measured/design AP50					5.0100							
Infiltration rate					0.4475 (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) =		0.4139 (21)							
Wind speed	Jan 4.5000	Feb 4.5000	Mar 4.4000	Apr 3.9000	May 3.8000	Jun 3.4000	Jul 3.3000	Aug 3.3000	Sep 3.5000	Oct 3.8000	Nov 3.9000	Dec 4.1000 (22)
Wind factor	1.1250	1.1250	1.1000	0.9750	0.9500	0.8500	0.8250	0.8250	0.8750	0.9500	0.9750	1.0250 (22a)
Adj infiltr rate	0.4657	0.4657	0.4553	0.4036	0.3932	0.3518	0.3415	0.3415	0.3622	0.3932	0.4036	0.4243 (22b)
Effective ac	0.6084	0.6084	0.6037	0.5814	0.5773	0.5619	0.5583	0.5583	0.5656	0.5773	0.5814	0.5900 (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
Half Glazed Door			1.9600	1.3000	2.5480		(26a)
Solid Door			2.1000	1.2000	2.5200		(26)
Windows (Uw = 1.30)			7.9100	1.2357	9.7747		(27)
Ground Floor			41.7800	0.1900	7.9382	75.6000	3158.5680 (28a)
Brick Wall	41.7800	11.9700	29.8100	0.2400	7.1544	39.3600	1173.3216 (29a)
Ins Joist	41.7800		41.7800	0.1000	4.1780	5.8200	243.1596 (30)
Total net area of external elements Aum(A, m ²)			125.3400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	34.1133		(33)
Party Wall			42.3000	0.0000	0.0000	54.0300	2285.4690 (32)
Ground Floor Stud			70.7000			5.8200	411.4740 (32c)
1st Floor Stud			104.3100			5.8200	607.0842 (32c)
Int Floors			41.7800			18.0000	752.0400 (32d)
Int Ceilings			41.7800			5.8200	243.1596 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	8874.2759 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							106.2024 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.6315 (36)
Total fabric heat loss						(33) + (36) =	38.7448 (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 = $0.33 \times (25)m \times (5)$

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	40.7687	40.7687	40.4494	38.9604	38.6842	37.6509	37.4105	37.4105	37.8984	38.6842	38.9604	39.5345 (38)
Heat transfer coeff	79.5135	79.5135	79.1942	77.7052	77.4290	76.3957	76.1553	76.1553	76.6432	77.4290	77.7052	78.2793 (39)
Average = Sum(39)m / 12 =												77.6765 (39)
HLP	0.9516	0.9516	0.9478	0.9299	0.9266	0.9143	0.9114	0.9114	0.9172	0.9266	0.9299	0.9368 (40)
HLP (average)												0.9296 (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 2.5269 (42)
 Average daily hot water use (litres/day) 94.2150 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	103.6365	99.8679	96.0993	92.3307	88.5621	84.7935	84.7935	88.5621	92.3307	96.0993	99.8679	103.6365 (44)
Energy conte	153.6899	134.4182	138.7075	120.9286	116.0339	100.1284	92.7837	106.4706	107.7422	125.5632	137.0620	148.8405 (45)
Energy content (annual)												Total = Sum(45)m = 1482.3688 (45)
Distribution loss (46)m = $0.15 \times (45)m$	23.0535	20.1627	20.8061	18.1393	17.4051	15.0193	13.9176	15.9706	16.1613	18.8345	20.5593	22.3261 (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	14.1254	12.7475	14.0765	13.5808	14.0032	13.5166	13.9454	13.9829	13.5515	14.0462	13.6413	14.1138 (61)
Total heat required for water heating calculated for each month	167.8154	147.1657	152.7840	134.5094	130.0371	113.6450	106.7291	120.4535	121.2938	139.6093	150.7033	162.9543 (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)
Solar input (sum of months) = Sum(63)m =												0.0000 (63)
Output from w/h	167.8154	147.1657	152.7840	134.5094	130.0371	113.6450	106.7291	120.4535	121.2938	139.6093	150.7033	162.9543 (64)
Total per year (kWh/year) = Sum(64)m =												1647.6997 (64)
RHI water heating demand												1648 (64)
Heat gains from water heating, kWh/month	54.6333	47.8809	49.6394	43.6040	42.0821	36.6718	34.3369	38.8972	39.2122	45.2613	48.9835	53.0179 (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	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	59.0175	52.4188	42.6299	32.2736	24.1249	20.3672	22.0075	28.6062	38.3952	48.7515	56.9002	60.6578 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	338.3877	341.8991	333.0505	314.2128	290.4336	268.0845	253.1540	249.6426	258.4912	277.3289	301.1081	323.4571 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886 (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)	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779 (71)
Water heating gains (Table 5)	73.4318	71.2514	66.7196	60.5610	56.5619	50.9331	46.1518	52.2812	54.4614	60.8351	68.0326	71.2606 (72)
Total internal gains	577.0646	571.7969	548.6275	513.2750	477.3480	445.6124	427.5408	436.7575	457.5753	493.1430	532.2684	561.6032 (73)

6. Solar gains

[Jan]	Area m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
North	4.0500	11.3201	0.4700	0.0000	0.7700	16.5919 (74)						
South	3.8600	49.0238	0.4700	0.0000	0.7700	68.4830 (78)						
Solar gains	85.0749	146.0252	200.4446	258.4901	280.3460	305.1561	281.8110	257.2769	225.7703	165.4355	114.4066	80.7106 (83)
Total gains	662.1395	717.8221	749.0722	771.7651	757.6940	750.7686	709.3518	694.0344	683.3456	658.5785	646.6750	642.3137 (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	31.0020	31.0020	31.1270	31.7234	31.8366	32.2672	32.3691	32.3691	32.1630	31.8366	31.7234	31.4908
alpha	3.0668	3.0668	3.0751	3.1149	3.1224	3.1511	3.1579	3.1579	3.1442	3.1224	3.1149	3.0994
util living area	0.9369	0.9188	0.8850	0.8232	0.7336	0.5669	0.4480	0.4653	0.6606	0.8305	0.9076	0.9414 (86)
MIT	19.4382	19.6124	19.9446	20.3390	20.6514	20.8925	20.9612	20.9558	20.8098	20.4074	19.9028	19.4234 (87)
Th 2	20.1239	20.1239	20.1271	20.1421	20.1449	20.1554	20.1578	20.1578	20.1529	20.1449	20.1421	20.1363 (88)
util rest of house	0.9286	0.9082	0.8695	0.7986	0.6941	0.5051	0.3705	0.3876	0.6052	0.8027	0.8940	0.9336 (89)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

MIT 2	18.7037	18.8733	19.1989	19.5871	19.8772	20.0885	20.1395	20.1364	20.0233	19.6591	19.1737	18.6987 (90)
Living area fraction									fLA = Living area / (4) =			0.1869 (91)
MIT	18.8410	19.0115	19.3383	19.7277	20.0219	20.2388	20.2931	20.2896	20.1703	19.7989	19.3100	18.8342 (92)
Temperature adjustment												-0.1500
adjusted MIT	18.6910	18.8615	19.1883	19.5777	19.8719	20.0888	20.1431	20.1396	20.0203	19.6489	19.1600	18.6842 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9118	0.8899	0.8500	0.7803	0.6803	0.5000	0.3690	0.3859	0.5958	0.7843	0.8753	0.9175 (94)
Useful gains	603.7073	638.7648	636.6862	602.1834	515.4747	375.3666	261.7850	267.7959	407.1638	516.5170	566.0418	589.3115 (95)
Ext temp.	4.3000	4.8000	6.6000	9.0000	11.8000	14.8000	16.6000	16.5000	14.0000	10.5000	7.1000	4.2000 (96)
Heat loss rate W												
	1144.2799	1118.0783	996.9180	821.9402	625.0011	404.0418	269.8289	277.1756	461.4145	708.3934	937.1257	1133.8133 (97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000 (97a)
Space heating kWh												
	402.1861	322.0987	268.0125	158.2249	81.4876	0.0000	0.0000	0.0000	0.0000	142.7560	267.1804	405.1093 (98)
Space heating												2047.0555 (98)
RHI space heating demand												2047 (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	41.7800 (1b)	2.3300 (2b)	97.3474 (1b) - (3b)
First floor	41.7800 (1c)	2.5300 (2c)	105.7034 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	83.5600		203.0508 (5)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =

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				4 * 10 =	40.0000 (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)				40.0000 / (5) =	0.1970 (8)
Pressure test					Yes
Measured/design AP50					5.0100
Infiltration rate					0.4475 (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) =	0.4139 (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												
Effective ac	0.5278	0.5174	0.5071	0.4553	0.4450	0.3932	0.3932	0.3829	0.4139	0.4450	0.4657	0.4864 (22b)
	0.6393	0.6339	0.6286	0.6037	0.5990	0.5773	0.5773	0.5733	0.5857	0.5990	0.6084	0.6183 (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
Half Glazed Door			1.9600	1.3000	2.5480		(26a)
Solid Door			2.1000	1.2000	2.5200		(26)
Windows (Uw = 1.30)			7.9100	1.2357	9.7747		(27)
Ground Floor			41.7800	0.1900	7.9382	75.6000	3158.5680 (28a)
Brick Wall	41.7800	11.9700	29.8100	0.2400	7.1544	39.3600	1173.3216 (29a)
Ins Joist	41.7800		41.7800	0.1000	4.1780	5.8200	243.1596 (30)
Total net area of external elements Aum(A, m ²)			125.3400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	34.1133		(33)
Party Wall			42.3000	0.0000	0.0000	54.0300	2285.4690 (32)
Ground Floor Stud			70.7000			5.8200	411.4740 (32c)
1st Floor Stud			104.3100			5.8200	607.0842 (32c)
Int Floors			41.7800			18.0000	752.0400 (32d)
Int Ceilings			41.7800			5.8200	243.1596 (32e)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 8874.2759 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							106.2024 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.6315 (36)
Total fabric heat loss							(33) + (36) = 38.7448 (37)

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	42.8353	42.4729	42.1177	40.4494	40.1372	38.6842	38.6842	38.4151	39.2439	40.1372	40.7687	41.4288 (38)
Average = Sum(39)m / 12 =	81.5801	81.2177	80.8625	79.1942	78.8820	77.4290	77.4290	77.1599	77.9887	78.8820	79.5135	80.1736 (39)
HLP	0.9763	0.9720	0.9677	0.9478	0.9440	0.9266	0.9266	0.9234	0.9333	0.9440	0.9516	0.9595 (40)
HLP (average)												0.9477 (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												2.5269 (42)
Average daily hot water use (litres/day)												94.2150 (43)
Daily hot water use	103.6365	99.8679	96.0993	92.3307	88.5621	84.7935	84.7935	88.5621	92.3307	96.0993	99.8679	103.6365 (44)
Energy conte	153.6899	134.4182	138.7075	120.9286	116.0339	100.1284	92.7837	106.4706	107.7422	125.5632	137.0620	148.8405 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

Energy content (annual)													Total = Sum(45)m =	1482.3688 (45)
Distribution loss (46)m = 0.15 x (45)m														
	23.0535	20.1627	20.8061	18.1393	17.4051	15.0193	13.9176	15.9706	16.1613	18.8345	20.5593	22.3261	(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	0.0000 (56)	
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)	
Combi loss	14.1254	12.7475	14.0765	13.5808	14.0032	13.5166	13.9454	13.9829	13.5515	14.0462	13.6413	14.1138	(61)	
Total heat required for water heating calculated for each month	167.8154	147.1657	152.7840	134.5094	130.0371	113.6450	106.7291	120.4535	121.2938	139.6093	150.7033	162.9543	(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)	
Solar input (sum of months) = Sum(63)m =	0.0000 (63)													
Output from w/h	167.8154	147.1657	152.7840	134.5094	130.0371	113.6450	106.7291	120.4535	121.2938	139.6093	150.7033	162.9543	(64)	
Heat gains from water heating, kWh/month	54.6333	47.8809	49.6394	43.6040	42.0821	36.6718	34.3369	38.8972	39.2122	45.2613	48.9835	53.0179	(65)	
Total per year (kWh/year) = Sum(64)m =	1647.6997 (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	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	59.0175	52.4188	42.6299	32.2736	24.1249	20.3672	22.0075	28.6062	38.3952	48.7515	56.9002	60.6578	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	338.3877	341.8991	333.0505	314.2128	290.4336	268.0845	253.1540	249.6426	258.4912	277.3289	301.1081	323.4571	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	(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)	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	(71)
Water heating gains (Table 5)	73.4318	71.2514	66.7196	60.5610	56.5619	50.9331	46.1518	52.2812	54.4614	60.8351	68.0326	71.2606	(72)
Total internal gains	577.0646	571.7969	548.6275	513.2750	477.3480	445.6124	427.5408	436.7575	457.5753	493.1430	532.2684	561.6032	(73)

6. Solar gains

[Jan]		Area m ²	Solar flux Table 6a W/m ²	Specific data g or Table 6b	Specific data FF or Table 6c	Access factor Table 6d	Gains W						
North		4.0500	10.6334	0.4700	0.0000	0.7700	15.5853 (74)						
South		3.8600	46.7521	0.4700	0.0000	0.7700	65.3095 (78)						
Solar gains	80.8949	136.7445	186.8592	235.2842	269.9778	271.6621	260.3386	233.3678	203.1781	150.8210	96.6406	69.4261	(83)
Total gains	657.9595	708.5414	735.4867	748.5592	747.3257	717.2746	687.8794	670.1253	660.7534	643.9640	628.9090	631.0293	(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	30.2167	30.3515	30.4848	31.1270	31.2502	31.8366	31.8366	31.9476	31.6081	31.2502	31.0020	30.7467	
alpha	3.0144	3.0234	3.0323	3.0751	3.0833	3.1224	3.1224	3.1298	3.1072	3.0833	3.0668	3.0498	
util living area	0.9391	0.9215	0.8931	0.8386	0.7481	0.6048	0.4658	0.4929	0.6742	0.8377	0.9149	0.9448	(86)
MIT	19.3709	19.5652	19.8682	20.2694	20.6136	20.8625	20.9548	20.9451	20.7942	20.3781	19.8304	19.3475	(87)
Th 2	20.1031	20.1068	20.1103	20.1271	20.1302	20.1449	20.1449	20.1476	20.1393	20.1302	20.1239	20.1172	(88)
util rest of house	0.9309	0.9110	0.8783	0.8152	0.7094	0.5435	0.3851	0.4133	0.6176	0.8101	0.9020	0.9374	(89)
MIT 2	18.6224	18.8148	19.1126	19.5107	19.8318	20.0570	20.1236	20.1204	19.9995	19.6209	19.0902	18.6102	(90)
Living area fraction	fLA = Living area / (4) =												0.1869 (91)
MIT	18.7623	18.9550	19.2539	19.6525	19.9779	20.2076	20.2790	20.2746	20.1480	19.7625	19.2285	18.7480	(92)
Temperature adjustment													-0.1500
adjusted MIT	18.6123	18.8050	19.1039	19.5025	19.8279	20.0576	20.1290	20.1246	19.9980	19.6125	19.0785	18.5980	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	0.9139	0.8925	0.8585	0.7961	0.6945	0.5368	0.3835	0.4110	0.6075	0.7911	0.8833	0.9213	(94)
Useful gains	601.3293	632.3785	631.4306	595.9149	519.0517	385.0652	263.8146	275.4253	401.3868	509.4263	555.5159	581.3779	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	16.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1167.5980	1129.3359	1019.1808	839.6558	641.1489	422.5758	273.2442	287.3862	459.9803	710.9216	952.4562	1154.3405	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh	421.3039	333.9554	288.4861	175.4934	90.8403	0.0000	0.0000	0.0000	0.0000	149.9125	285.7970	426.2842	(98)
Space heating													2172.0729 (98)
Space heating per m ²													(98) / (4) = 25.9942 (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

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													2400.0805 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	421.3039	333.9554	288.4861	175.4934	90.8403	0.0000	0.0000	0.0000	0.0000	149.9125	285.7970	426.2842	(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)	465.5292	369.0115	318.7692	193.9154	100.3760	0.0000	0.0000	0.0000	0.0000	165.6491	315.7978	471.0323	(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	167.8154	147.1657	152.7840	134.5094	130.0371	113.6450	106.7291	120.4535	121.2938	139.6093	150.7033	162.9543	(64)
Efficiency of water heater (217)m	89.5648	89.4966	89.3658	89.0832	88.5883	87.3000	87.3000	87.3000	87.3000	88.9282	89.3690	87.3000	(216)
Fuel for water heating, kWh/month	187.3675	164.4372	170.9647	150.9930	146.7881	130.1775	122.2555	137.9765	138.9390	156.9911	168.6304	181.8852	(219)
Water heating fuel used													1857.4060 (219)
Annual totals kWh/year													
Space heating fuel - main system													2400.0805 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans:													
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													75.0000 (231)
Electricity for lighting (calculated in Appendix L)													416.9072 (232)
Total delivered energy for all uses													4749.3937 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2400.0805	3.4800	83.5228 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1857.4060	3.4800	64.6377 (247)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	416.9072	13.1900	54.9901 (250)
Additional standing charges			120.0000 (251)
Total energy cost			333.0431 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.0880 (257)
SAP value		84.8219
SAP rating (Section 12)		85 (258)
SAP band		B

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	2400.0805	0.2160	518.4174 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1857.4060	0.2160	401.1997 (264)
Space and water heating			919.6171 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	416.9072	0.5190	216.3748 (268)
Total kg/year			1174.9169 (272)
CO2 emissions per m2			14.0600 (273)
EI value			87.7537
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	$3.48 / 0.8860 = 3.928$, stars = 4
Water heating environmental impact	$0.216 / 0.8860 = 0.2438$, 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	41.7800 (1b)	x 2.3300 (2b)	= 97.3474 (1b) - (3b)
First floor	41.7800 (1c)	x 2.5300 (2c)	= 105.7034 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	83.5600		(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 203.0508 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour							
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)							
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)							
Number of intermittent fans					4 * 10 = 40.0000 (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) =					40.0000 / (5) = 0.1970 (8)							
Pressure test					Yes							
Measured/design AP50					5.0100							
Infiltration rate					0.4475 (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) =	0.4139 (21)							
Wind speed	Jan 4.5000	Feb 4.5000	Mar 4.4000	Apr 3.9000	May 3.8000	Jun 3.4000	Jul 3.3000	Aug 3.3000	Sep 3.5000	Oct 3.8000	Nov 3.9000	Dec 4.1000 (22)
Wind factor	1.1250	1.1250	1.1000	0.9750	0.9500	0.8500	0.8250	0.8250	0.8750	0.9500	0.9750	1.0250 (22a)
Adj infilt rate												
Effective ac	0.4657	0.4657	0.4553	0.4036	0.3932	0.3518	0.3415	0.3415	0.3622	0.3932	0.4036	0.4243 (22b)
	0.6084	0.6084	0.6037	0.5814	0.5773	0.5619	0.5583	0.5583	0.5656	0.5773	0.5814	0.5900 (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
Half Glazed Door			1.9600	1.3000	2.5480		(26a)
Solid Door			2.1000	1.2000	2.5200		(26)
Windows (Uw = 1.30)			7.9100	1.2357	9.7747		(27)
Ground Floor			41.7800	0.1900	7.9382	75.6000	3158.5680 (28a)
Brick Wall	41.7800	11.9700	29.8100	0.2400	7.1544	39.3600	1173.3216 (29a)
Ins Joist	41.7800		41.7800	0.1000	4.1780	5.8200	243.1596 (30)
Total net area of external elements Aum(A, m ²)			125.3400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	34.1133		(33)
Party Wall			42.3000	0.0000	0.0000	54.0300	2285.4690 (32)
Ground Floor Stud			70.7000			5.8200	411.4740 (32c)
1st Floor Stud			104.3100			5.8200	607.0842 (32c)
Int Floors			41.7800			18.0000	752.0400 (32d)
Int Ceilings			41.7800			5.8200	243.1596 (32e)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 8874.2759 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							106.2024 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.6315 (36)
Total fabric heat loss							(33) + (36) = 38.7448 (37)

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	40.7687	40.7687	40.4494	38.9604	38.6842	37.6509	37.4105	37.4105	37.8984	38.6842	38.9604	39.5345 (38)
Average = Sum(39)m / 12 =	79.5135	79.5135	79.1942	77.7052	77.4290	76.3957	76.1553	76.1553	76.6432	77.4290	77.7052	78.2793 (39)
												77.6765 (39)
HLP	0.9516	0.9516	0.9478	0.9299	0.9266	0.9143	0.9114	0.9114	0.9172	0.9266	0.9299	0.9368 (40)
HLP (average)												0.9296 (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												2.5269 (42)
Average daily hot water use (litres/day)												94.2150 (43)
Daily hot water use	103.6365	99.8679	96.0993	92.3307	88.5621	84.7935	84.7935	88.5621	92.3307	96.0993	99.8679	103.6365 (44)
Energy conte	153.6899	134.4182	138.7075	120.9286	116.0339	100.1284	92.7837	106.4706	107.7422	125.5632	137.0620	148.8405 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

Energy content (annual)													Total = Sum(45)m =	1482.3688 (45)
Distribution loss (46)m = 0.15 x (45)m														
	23.0535	20.1627	20.8061	18.1393	17.4051	15.0193	13.9176	15.9706	16.1613	18.8345	20.5593	22.3261	(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	14.1254	12.7475	14.0765	13.5808	14.0032	13.5166	13.9454	13.9829	13.5515	14.0462	13.6413	14.1138	(61)	
Total heat required for water heating calculated for each month	167.8154	147.1657	152.7840	134.5094	130.0371	113.6450	106.7291	120.4535	121.2938	139.6093	150.7033	162.9543	(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)	
Solar input (sum of months) = Sum(63)m =													0.0000 (63)	
Output from w/h	167.8154	147.1657	152.7840	134.5094	130.0371	113.6450	106.7291	120.4535	121.2938	139.6093	150.7033	162.9543	(64)	
Total per year (kWh/year) = Sum(64)m =													1647.6997 (64)	
Heat gains from water heating, kWh/month	54.6333	47.8809	49.6394	43.6040	42.0821	36.6718	34.3369	38.8972	39.2122	45.2613	48.9835	53.0179	(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	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	151.6168	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	59.0175	52.4188	42.6299	32.2736	24.1249	20.3672	22.0075	28.6062	38.3952	48.7515	56.9002	60.6578	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	338.3877	341.8991	333.0505	314.2128	290.4336	268.0845	253.1540	249.6426	258.4912	277.3289	301.1081	323.4571	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	52.6886	(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)	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	-101.0779	(71)
Water heating gains (Table 5)	73.4318	71.2514	66.7196	60.5610	56.5619	50.9331	46.1518	52.2812	54.4614	60.8351	68.0326	71.2606	(72)
Total internal gains	577.0646	571.7969	548.6275	513.2750	477.3480	445.6124	427.5408	436.7575	457.5753	493.1430	532.2684	561.6032	(73)

6. Solar gains

[Jan]		Area m ²	Solar flux Table 6a W/m ²	Specific data or Table 6b	g	Specific data or Table 6c	FF	Access factor Table 6d	Gains W				
North		4.0500	11.3201	0.4700	0.0000	0.7700	0.7700	16.5919 (74)					
South		3.8600	49.0238	0.4700	0.0000	0.7700	0.7700	68.4830 (78)					
Solar gains	85.0749	146.0252	200.4446	258.4901	280.3460	305.1561	281.8110	257.2769	225.7703	165.4355	114.4066	80.7106	(83)
Total gains	662.1395	717.8221	749.0722	771.7651	757.6940	750.7686	709.3518	694.0344	683.3456	658.5785	646.6750	642.3137	(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	31.0020	31.0020	31.1270	31.7234	31.8366	32.2672	32.3691	32.3691	32.1630	31.8366	31.7234	31.4908	
alpha	3.0668	3.0668	3.0751	3.1149	3.1224	3.1511	3.1579	3.1579	3.1442	3.1224	3.1149	3.0994	
util living area	0.9369	0.9188	0.8850	0.8232	0.7336	0.5669	0.4480	0.4653	0.6606	0.8305	0.9076	0.9414	(86)
MIT	19.4382	19.6124	19.9446	20.3390	20.6514	20.8925	20.9612	20.9558	20.8098	20.4074	19.9028	19.4234	(87)
Th 2	20.1239	20.1239	20.1271	20.1421	20.1449	20.1554	20.1578	20.1578	20.1529	20.1449	20.1421	20.1363	(88)
util rest of house	0.9286	0.9082	0.8695	0.7986	0.6941	0.5051	0.3705	0.3876	0.6052	0.8027	0.8940	0.9336	(89)
MIT 2	18.7037	18.8733	19.1989	19.5871	19.8772	20.0885	20.1395	20.1364	20.0233	19.6591	19.1737	18.6987	(90)
Living area fraction													fLA = Living area / (4) = 0.1869 (91)
MIT	18.8410	19.0115	19.3383	19.7277	20.0219	20.2388	20.2931	20.2896	20.1703	19.7989	19.3100	18.8342	(92)
Temperature adjustment													-0.1500
adjusted MIT	18.6910	18.8615	19.1883	19.5777	19.8719	20.0888	20.1431	20.1396	20.0203	19.6489	19.1600	18.6842	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	0.9118	0.8899	0.8500	0.7803	0.6803	0.5000	0.3690	0.3859	0.5958	0.7843	0.8753	0.9175	(94)
Useful gains	603.7073	638.7648	636.6862	602.1834	515.4747	375.3666	261.7850	267.7959	407.1638	516.5170	566.0418	589.3115	(95)
Ext temp.	4.3000	4.8000	6.6000	9.0000	11.8000	14.8000	16.6000	16.5000	14.0000	10.5000	7.1000	4.2000	(96)
Heat loss rate W	1144.2799	1118.0783	996.9180	821.9402	625.0011	404.0418	269.8289	277.1756	461.4145	708.3934	937.1257	1133.8133	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh	402.1861	322.0987	268.0125	158.2249	81.4876	0.0000	0.0000	0.0000	0.0000	142.7560	267.1804	405.1093	(98)
Space heating													2047.0555 (98)
Space heating per m ²													(98) / (4) = 24.4980 (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													2261.9398 (211)
Space heating requirement	402.1861	322.0987	268.0125	158.2249	81.4876	0.0000	0.0000	0.0000	0.0000	142.7560	267.1804	405.1093	(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)	444.4045	355.9101	296.1464	174.8342	90.0416	0.0000	0.0000	0.0000	0.0000	157.7415	295.2269	447.6346	(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	167.8154	147.1657	152.7840	134.5094	130.0371	113.6450	106.7291	120.4535	121.2938	139.6093	150.7033	162.9543	(64)
Efficiency of water heater (217)m	89.5338	89.4715	89.3114	89.0010	88.5056	87.3000	87.3000	87.3000	87.3000	88.8890	89.3193	87.3000	(216)
Fuel for water heating, kWh/month	187.4325	164.4833	171.0689	151.1325	146.9252	130.1775	122.2555	137.9765	138.9390	157.0603	168.7243	181.9533	(219)
Water heating fuel used													1858.1288 (219)
Annual totals kWh/year													
Space heating fuel - main system													2261.9398 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans:													
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													75.0000 (231)
Electricity for lighting (calculated in Appendix L)													416.9072 (232)
Total delivered energy for all uses													4611.9758 (238)

10a. Fuel costs - using BEDF prices (476)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2261.9398	3.8700	87.5371 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1858.1288	3.8700	71.9096 (247)
Pumps and fans for heating	75.0000	18.9000	14.1750 (249)
Energy for lighting	416.9072	18.9000	78.7955 (250)
Additional standing charges			93.0000 (251)
Total energy cost			345.4171 (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	2261.9398	0.2160	488.5790 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1858.1288	0.2160	401.3558 (264)
Space and water heating			889.9348 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	416.9072	0.5190	216.3748 (268)
Total kg/year			1145.2347 (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	2261.9398	1.2200	2759.5665 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1858.1288	1.2200	2266.9172 (264)
Space and water heating			5026.4837 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	416.9072	3.0700	1279.9051 (268)
Primary energy kWh/year			6536.6389 (272)
Primary energy kWh/m2/year			78.2269 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 85
 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	Cancelled by user
O	Not considered
P	Not considered
R	Not considered
S	Not considered
T	Not considered
U Solar photovoltaic panels	Cancelled by user
A2	Not considered
A3	Not considered
T2	Not considered
W	Not considered
X	Not considered
Y	Not considered
J2	Not considered
Q2	Not considered
Z1	Not considered
Z2	Not considered
Z3	Not considered
Z4	Not considered
Z5	Not considered
V2 Wind turbine	Not applicable
L2	Not considered
Q3	Not considered
O3	Not considered

Recommended measures: (none)	SAP change	Cost change	CO2 change
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Recommended measures (none)	Typical annual savings	Energy efficiency	Environmental impact
	Total Savings £0	0.00 kg/m ²	
Potential energy efficiency rating:		B 85	
Potential environmental impact rating:			B 88

Fuel prices for cost data on this page from database revision number 476 TEST (01 Apr 2021)
 Recommendation texts revision number 4.9c (22 Feb 2014)

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

	Current	Potential	Saving
Electricity	£93	£93	£0
Mains gas	£252	£252	£0
Space heating	£195	£195	£0
Water heating	£72	£72	£0
Lighting	£79	£79	£0
Total cost of fuels	£345	£345	£0
Total cost of uses	£346	£346	£0
Delivered energy	55 kWh/m ²	55 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	1.1 tonnes	1.1 tonnes	0.0 tonnes
CO2 emissions per m ²	14 kg/m ²	14 kg/m ²	0 kg/m ²
Primary energy	78 kWh/m ²	78 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	094 - PRJ011661	Issued on Date	27/04/2021
Assessment Reference	094 M	Prop Type Ref	Sorley
Property	Plot 94		

SAP Rating	85 B	DER	15.63	TER	16.98
Environmental	88 B	% DER<TER	7.96		
CO₂ Emissions (t/year)	1.15	DFEE	34.97	TFEE	43.28
General Requirements Compliance	Pass	% DFEE<TFEE	19.21		

Assessor Details	Mr. Michael Juckes, Michael Juckes, Tel: 02033971373, michael@briaryenergy.co.uk	Assessor ID	T850-0001
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Client	
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SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	16.98	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	15.63	kgCO ₂ /m ²	Pass
	-1.35 (-8.0%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	43.28	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	34.97	kWh/m ² /yr	
	-8.3 (-19.2%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.24 (max. 0.30)	0.24 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.19 (max. 0.25)	0.19 (max. 0.70)	Pass
Roof	0.10 (max. 0.20)	0.10 (max. 0.35)	Pass
Openings	1.28 (max. 2.00)	1.30 (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

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



Main heating system

Boiler system with radiators or underfloor - Mains gas
Data from database
Ideal LOGIC COMBI ESP1 35
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

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Midlands)

Not significant

Pass

Based on:

Overshading

Average

Windows facing North

4.05 m², No overhang

Windows facing South

3.86 m², No overhang

Air change rate

4.00 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

0.10

W/m²K

Thermal bridging γ -value

0.037

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.