

PREDICTED ENERGY ASSESSMENT



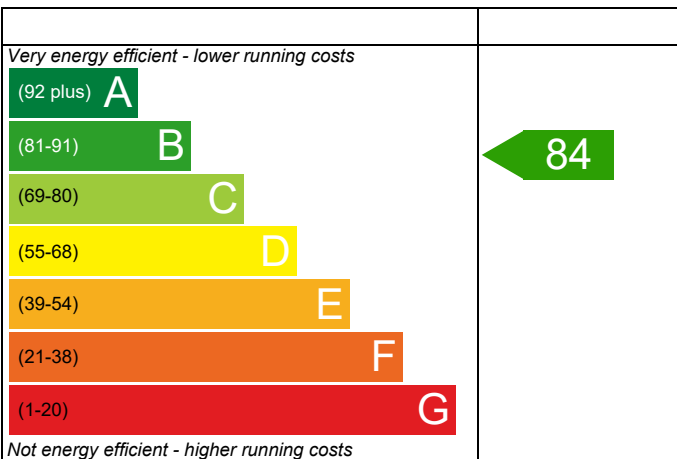
Plot 153

Dwelling type: House, Semi-Detached
 Date of assessment: 02/08/2021
 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.

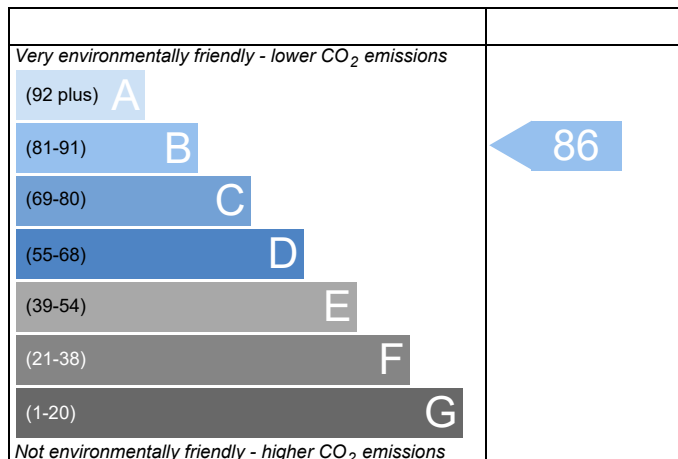
Energy Efficiency Rating



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	153 - PRJ011855	Issued on Date	02/08/2021
Assessment Reference	153 S	Prop Type Ref	Sorley
Property	Plot 153		

SAP Rating	84 B	DER	17.59	TER	18.42
Environmental	86 B	% DER<TER	4.53		
CO ₂ Emissions (t/year)	1.26	DFEE	43.30	TFEE	50.97
General Requirements Compliance	Pass	% DFEE<TFEE	15.06		

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

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	18.42	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	17.59	kgCO ₂ /m ²	Pass
	-0.83 (-4.5%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	50.97	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	43.30	kWh/m ² /yr	
	-7.7 (-15.1%)	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	0.22 (max. 0.25)	0.22 (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 (East Anglia)

Slight

Pass

Based on:

Overshading

Average

Windows facing South East

3.86 m², No overhang

Windows facing North West

4.05 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

0.025

W/m²K

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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	153 - PRJ011855	Issued on Date	02/08/2021
Assessment Reference	153 S	Prop Type Ref	Sorley
Property	Plot 153		

SAP Rating	84 B	DER	17.59	TER	18.42
Environmental	86 B	% DER<TER	4.53		
CO ₂ Emissions (t/year)	1.26	DFEE	43.30	TTEE	50.97
General Requirements Compliance	Pass	% DFEE<TTEE	15.06		

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 4.9000	Feb 4.8000	Mar 4.7000	Apr 4.2000	May 4.2000	Jun 3.7000	Jul 3.8000	Aug 3.8000	Sep 4.0000	Oct 4.2000	Nov 4.3000	Dec 4.5000 (22)
Wind factor	1.2250	1.2000	1.1750	1.0500	1.0500	0.9250	0.9500	0.9500	1.0000	1.0500	1.0750	1.1250 (22a)
Adj infiltr rate												
Effective ac	0.5071	0.4967	0.4864	0.4346	0.4346	0.3829	0.3932	0.3932	0.4139	0.4346	0.4450	0.4657 (22b)
	0.6286	0.6234	0.6183	0.5945	0.5945	0.5733	0.5773	0.5773	0.5857	0.5945	0.5990	0.6084 (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	0.2200	9.1916	75.6000	3158.5680 (28a)
Brick Wall	88.9600	11.9700	76.9900	0.2400	18.4776	39.3600	3030.3264 (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)			172.5200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	46.6899		(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) =	10731.2807 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							128.4260 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.3315 (36)
Total fabric heat loss						(33) + (36) =	51.0214 (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	42.1177	41.7697	41.4288	39.8323	39.8323	38.4151	38.6842	38.6842	39.2439	39.8323	40.1372	40.7687 (38)
Heat transfer coeff	93.1391	92.7911	92.4503	90.8537	90.8537	89.4365	89.7056	89.7056	90.2653	90.8537	91.1587	91.7901 (39)
Average = Sum(39)m / 12 =												91.0836 (39)
HLP	1.1146	1.1105	1.1064	1.0873	1.0873	1.0703	1.0735	1.0735	1.0802	1.0873	1.0909	1.0985 (40)
HLP (average)												1.0900 (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

Average daily hot water use (litres/day)

	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						
Southeast	3.8600	40.9830	0.4700	0.0000	0.7700	57.2506 (77)						
Northwest	4.0500	12.9465	0.4700	0.0000	0.7700	18.9757 (81)						
Solar gains	76.2263	126.9610	186.2825	269.8254	315.4980	337.2696	317.4958	275.5978	223.0857	151.0885	94.7274	63.8591 (83)
Total gains	653.2909	698.7579	734.9100	783.1004	792.8460	782.8820	745.0366	712.3553	680.6610	644.2315	626.9958	625.4622 (84)

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	32.0049	32.1250	32.2434	32.8100	32.8100	33.3299	33.2299	33.2299	33.0239	32.8100	32.7003	32.4753
alpha	3.1337	3.1417	3.1496	3.1873	3.1873	3.2220	3.2153	3.2153	3.2016	3.1873	3.1800	3.1650
util living area	0.9582	0.9465	0.9196	0.8575	0.7511	0.5753	0.3954	0.4117	0.6690	0.8615	0.9367	0.9622 (86)
MIT	19.3537	19.5133	19.8560	20.3054	20.6711	20.9057	20.9805	20.9781	20.8392	20.4100	19.8383	19.3417 (87)
Th 2	19.9889	19.9923	19.9956	20.0112	20.0112	20.0251	20.0225	20.0225	20.0170	20.0112	20.0082	20.0021 (88)
util rest of house	0.9510	0.9373	0.9051	0.8306	0.7014	0.4942	0.2877	0.3004	0.5916	0.8292	0.9240	0.9556 (89)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

MIT 2	18.5077	18.6665	19.0036	19.4446	19.7762	19.9750	20.0170	20.0163	19.9235	19.5496	18.9998	18.5060 (90)
Living area fraction									fLA = Living area / (4) =			0.1869 (91)
MIT	18.6658	18.8248	19.1630	19.6055	19.9435	20.1490	20.1971	20.1960	20.0946	19.7104	19.1565	18.6622 (92)
Temperature adjustment												-0.1500
adjusted MIT	18.5158	18.6748	19.0130	19.4555	19.7935	19.9990	20.0471	20.0460	19.9446	19.5604	19.0065	18.5122 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9374	0.9221	0.8876	0.8129	0.6891	0.4918	0.2905	0.3032	0.5853	0.8117	0.9078	0.9428 (94)
Useful gains	612.3673	644.3225	652.2993	636.5663	546.3348	385.0417	216.4567	215.9563	398.4001	522.8976	569.2069	589.7162 (95)
Ext temp.	4.7000	5.2000	7.0000	9.5000	12.5000	15.4000	17.6000	17.6000	15.0000	11.4000	7.7000	4.7000 (96)
Heat loss rate W												
	1286.7957	1250.3391	1110.6009	904.4965	662.6374	411.3195	219.5187	219.4241	446.3296	741.4048	1030.6888	1267.8270 (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												
	501.7747	407.2431	340.9764	192.9098	86.5291	0.0000	0.0000	0.0000	0.0000	162.5693	332.2669	504.5144 (98)
Space heating												2528.7837 (98)
RHI space heating demand												2529 (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	0.2200	9.1916	75.6000	3158.5680 (28a)
Brick Wall	88.9600	11.9700	76.9900	0.2400	18.4776	39.3600	3030.3264 (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)			172.5200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	46.6899		(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) = 10731.2807 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							128.4260 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.3315 (36)
Total fabric heat loss							(33) + (36) = 51.0214 (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 =	93.8567	93.4943	93.1391	91.4708	91.1587	89.7056	89.7056	89.4365	90.2653	91.1587	91.7901	92.4503 (39)
												91.4693 (39)
HLP	1.1232	1.1189	1.1146	1.0947	1.0909	1.0735	1.0735	1.0703	1.0802	1.0909	1.0985	1.1064 (40)
HLP (average)												1.0947 (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)	
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				
Southeast		3.8600	36.7938	0.4700		0.0000		0.7700	51.3986 (77)				
Northwest		4.0500	11.2829	0.4700		0.0000		0.7700	16.5374 (81)				
Solar gains	67.9359	121.2130	180.4394	248.0291	300.1355	307.7839	292.6504	252.2755	203.6094	137.9002	82.3719	57.4917	(83)
Total gains	645.0005	693.0099	729.0670	761.3041	777.4834	753.3963	720.1912	689.0330	661.1847	631.0432	614.6403	619.0948	(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	31.7602	31.8833	32.0049	32.5887	32.7003	33.2299	33.2299	33.3299	33.0239	32.7003	32.4753	32.2434	
alpha	3.1173	3.1256	3.1337	3.1726	3.1800	3.2153	3.2153	3.2220	3.2016	3.1800	3.1650	3.1496	
util living area	0.9621	0.9502	0.9277	0.8795	0.7926	0.6511	0.5092	0.5456	0.7388	0.8879	0.9461	0.9661	(86)
MIT	19.2573	19.4396	19.7560	20.1884	20.5697	20.8438	20.9477	20.9336	20.7495	20.2794	19.7125	19.2334	(87)
Th 2	19.9819	19.9854	19.9889	20.0052	20.0082	20.0225	20.0225	20.0251	20.0170	20.0082	20.0021	19.9956	(88)
util rest of house	0.9556	0.9417	0.9147	0.8566	0.7507	0.5791	0.4101	0.4476	0.6754	0.8622	0.9355	0.9603	(89)
MIT 2	18.4074	18.5890	18.9013	19.3301	19.6854	19.9288	20.0007	19.9956	19.8538	19.4255	18.8723	18.3941	(90)
Living area fraction	fLA = Living area / (4) =												0.1869 (91)
MIT	18.5663	18.7480	19.0611	19.4906	19.8507	20.0998	20.1777	20.1710	20.0212	19.5852	19.0294	18.5510	(92)
Temperature adjustment													-0.1500
adjusted MIT	18.4163	18.5980	18.9111	19.3406	19.7007	19.9498	20.0277	20.0210	19.8712	19.4352	18.8794	18.4010	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	0.9426	0.9269	0.8977	0.8385	0.7359	0.5732	0.4106	0.4472	0.6648	0.8441	0.9202	0.9482	(94)
Useful gains	607.9941	642.3387	654.4526	638.3211	572.1593	431.8729	295.7421	308.1280	439.5350	532.6798	565.5853	587.0210	(95)
Ext temp.	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)
Heat loss rate W	1324.9097	1280.6817	1155.9563	955.0072	729.3358	479.9112	307.4838	323.8470	520.9420	805.4008	1081.2306	1312.8845	(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	533.3852	428.9665	373.1188	228.0140	116.9394	0.0000	0.0000	0.0000	0.0000	202.9044	371.2646	540.0424	(98)
Space heating													2794.6352 (98)
Space heating per m ²													(98) / (4) = 33.4447 (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													3087.9947 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	533.3852	428.9665	373.1188	228.0140	116.9394	0.0000	0.0000	0.0000	0.0000	202.9044	371.2646	540.0424	(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)	589.3759	473.9961	412.2859	251.9492	129.2148	0.0000	0.0000	0.0000	0.0000	224.2037	410.2371	596.7319	(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	89.7130	89.6605	89.5464	89.2857	88.7865	87.3000	87.3000	87.3000	87.3000	89.1678	89.5523	87.3000	(216)
Fuel for water heating, kWh/month	187.0580	164.1366	170.6199	150.6506	146.4605	130.1775	122.2555	137.9765	138.9390	156.5693	168.2854	181.5899	(219)
Water heating fuel used													1854.7186 (219)
Annual totals kWh/year													
Space heating fuel - main system													3087.9947 (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													5434.6205 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	3087.9947	3.4800	107.4622 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1854.7186	3.4800	64.5442 (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			356.8890 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.1659 (257)
SAP value		83.7351
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	3087.9947	0.2160	667.0068 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1854.7186	0.2160	400.6192 (264)
Space and water heating			1067.6261 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	416.9072	0.5190	216.3748 (268)
Total kg/year			1322.9259 (272)
CO2 emissions per m2			15.8300 (273)
EI value			86.2109
EI rating			86 (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	$3.48 / 0.8872 = 3.922$, stars = 4
Water heating environmental impact	$0.216 / 0.8872 = 0.2435$, 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	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		(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 203.0508 (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				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	4.9000	4.8000	4.7000	4.2000	4.2000	3.7000	3.8000	3.8000	4.0000	4.2000	4.3000	4.5000 (22)
Wind factor	1.2250	1.2000	1.1750	1.0500	1.0500	0.9250	0.9500	0.9500	1.0000	1.0500	1.0750	1.1250 (22a)
Adj infilt rate												
Effective ac	0.5071	0.4967	0.4864	0.4346	0.4346	0.3829	0.3932	0.3932	0.4139	0.4346	0.4450	0.4657 (22b)
	0.6286	0.6234	0.6183	0.5945	0.5945	0.5733	0.5773	0.5773	0.5857	0.5945	0.5990	0.6084 (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
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	0.2200	9.1916	75.6000	3158.5680 (28a)
Brick Wall	88.9600	11.9700	76.9900	0.2400	18.4776	39.3600	3030.3264 (29a)
Ins Joist	41.7800		41.7800	0.1000	4.1780	5.8200	243.1596 (30)
Total net area of external elements Aum(A, m2)			172.5200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	46.6899		(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) = 10731.2807 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							128.4260 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.3315 (36)
Total fabric heat loss							(33) + (36) = 51.0214 (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	42.1177	41.7697	41.4288	39.8323	39.8323	38.4151	38.6842	38.6842	39.2439	39.8323	40.1372	40.7687 (38)
Average = Sum(39)m / 12 =	93.1391	92.7911	92.4503	90.8537	90.8537	89.4365	89.7056	89.7056	90.2653	90.8537	91.1587	91.7901 (39)
HLP	1.1146	1.1105	1.1064	1.0873	1.0873	1.0703	1.0735	1.0735	1.0802	1.0873	1.0909	1.0985 (40)
HLP (average)												1.0900 (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)	
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 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				
Southeast		3.8600	40.9830	0.4700		0.0000		0.7700	57.2506 (77)				
Northwest		4.0500	12.9465	0.4700		0.0000		0.7700	18.9757 (81)				
Solar gains	76.2263	126.9610	186.2825	269.8254	315.4980	337.2696	317.4958	275.5978	223.0857	151.0885	94.7274	63.8591	(83)
Total gains	653.2909	698.7579	734.9100	783.1004	792.8460	782.8820	745.0366	712.3553	680.6610	644.2315	626.9958	625.4622	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	32.0049	32.1250	32.2434	32.8100	32.8100	33.3299	33.2299	33.2299	33.0239	32.8100	32.7003	32.4753	
alpha	3.1337	3.1417	3.1496	3.1873	3.1873	3.2220	3.2153	3.2153	3.2016	3.1873	3.1800	3.1650	
util living area	0.9582	0.9465	0.9196	0.8575	0.7511	0.5753	0.3954	0.4117	0.6690	0.8615	0.9367	0.9622	(86)
MIT	19.3537	19.5133	19.8560	20.3054	20.6711	20.9057	20.9805	20.9781	20.8392	20.4100	19.8383	19.3417	(87)
Th 2	19.9889	19.9923	19.9956	20.0112	20.0112	20.0251	20.0225	20.0225	20.0170	20.0112	20.0082	20.0021	(88)
util rest of house	0.9510	0.9373	0.9051	0.8306	0.7014	0.4942	0.2877	0.3004	0.5916	0.8292	0.9240	0.9556	(89)
MIT 2	18.5077	18.6665	19.0036	19.4446	19.7762	19.9750	20.0170	20.0163	19.9235	19.5496	18.9998	18.5060	(90)
Living area fraction													fLA = Living area / (4) = 0.1869 (91)
MIT	18.6658	18.8248	19.1630	19.6055	19.9435	20.1490	20.1971	20.1960	20.0946	19.7104	19.1565	18.6622	(92)
Temperature adjustment													-0.1500
adjusted MIT	18.5158	18.6748	19.0130	19.4555	19.7935	19.9990	20.0471	20.0460	19.9446	19.5604	19.0065	18.5122	(93)

8. Space heating requirement

Utilisation	0.9374	0.9221	0.8876	0.8129	0.6891	0.4918	0.2905	0.3032	0.5853	0.8117	0.9078	0.9428	(94)
Useful gains	612.3673	644.3225	652.2993	636.5663	546.3348	385.0417	216.4567	215.9563	398.4001	522.8976	569.2069	589.7162	(95)
Ext temp.	4.7000	5.2000	7.0000	9.5000	12.5000	15.4000	17.6000	17.6000	15.0000	11.4000	7.7000	4.7000	(96)
Heat loss rate W	1286.7957	1250.3391	1110.6009	904.4965	662.6374	411.3195	219.5187	219.4241	446.3296	741.4048	1030.6888	1267.8270	(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	501.7747	407.2431	340.9764	192.9098	86.5291	0.0000	0.0000	0.0000	0.0000	162.5693	332.2669	504.5144	(98)
Space heating													2528.7837 (98)
Space heating per m2													(98) / (4) = 30.2631 (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

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													2794.2361 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	501.7747	407.2431	340.9764	192.9098	86.5291	0.0000	0.0000	0.0000	0.0000	162.5693	332.2669	504.5144	(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)	554.4472	449.9924	376.7695	213.1600	95.6123	0.0000	0.0000	0.0000	0.0000	179.6346	367.1458	557.4744	(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	89.6762	89.6279	89.4850	89.1574	88.5510	87.3000	87.3000	87.3000	87.3000	88.9929	89.4766	87.3000	(216)
Fuel for water heating, kWh/month	187.1348	164.1962	170.7369	150.8673	146.8499	130.1775	122.2555	137.9765	138.9390	156.8769	168.4277	181.6713	(219)
Water heating fuel used													1856.1096 (219)
Annual totals kWh/year													
Space heating fuel - main system													2794.2361 (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													5142.2529 (238)

10a. Fuel costs - using BEDF prices (479)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2794.2361	3.7400	104.5044 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1856.1096	3.7400	69.4185 (247)
Pumps and fans for heating	75.0000	19.1200	14.3400 (249)
Energy for lighting	416.9072	19.1200	79.7127 (250)
Additional standing charges			94.0000 (251)
Total energy cost			361.9756 (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	2794.2361	0.2160	603.5550 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1856.1096	0.2160	400.9197 (264)
Space and water heating			1004.4747 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	416.9072	0.5190	216.3748 (268)
Total kg/year			1259.7745 (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	2794.2361	1.2200	3408.9680 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1856.1096	1.2200	2264.4537 (264)
Space and water heating			5673.4217 (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			7183.5769 (272)
Primary energy kWh/m2/year			85.9691 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 84
 Current environmental impact rating: B 86

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 84	
Potential environmental impact rating:			B 86

Fuel prices for cost data on this page from database revision number 479 TEST (30 Jun 2021)
 Recommendation texts revision number 4.9c (22 Feb 2014)

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

	Current	Potential	Saving
Electricity	£94	£94	£0
Mains gas	£268	£268	£0
Space heating	£213	£213	£0
Water heating	£69	£69	£0
Lighting	£80	£80	£0
Total cost of fuels	£362	£362	£0
Total cost of uses	£362	£362	£0
Delivered energy	62 kWh/m ²	62 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	1.3 tonnes	1.3 tonnes	0.0 tonnes
CO2 emissions per m ²	15 kg/m ²	15 kg/m ²	0 kg/m ²
Primary energy	86 kWh/m ²	86 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	153 - PRJ011855	Issued on Date	02/08/2021
Assessment Reference	153 S	Prop Type Ref	Sorley
Property	Plot 153		

SAP Rating	84 B	DER	17.59	TER	18.42
Environmental	86 B	% DER<TER	4.53		
CO₂ Emissions (t/year)	1.26	DFEE	43.30	TFEE	50.97
General Requirements Compliance	Pass	% DFEE<TFEE	15.06		

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

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	18.42	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	17.59	kgCO ₂ /m ²	Pass
	-0.83 (-4.5%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	50.97	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	43.30	kWh/m ² /yr	
	-7.7 (-15.1%)	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	0.22 (max. 0.25)	0.22 (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 (East Anglia)

Slight

Pass

Based on:

Overshading

Average

Windows facing South East

3.86 m², No overhang

Windows facing North West

4.05 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

0.025

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.