

PREDICTED ENERGY ASSESSMENT

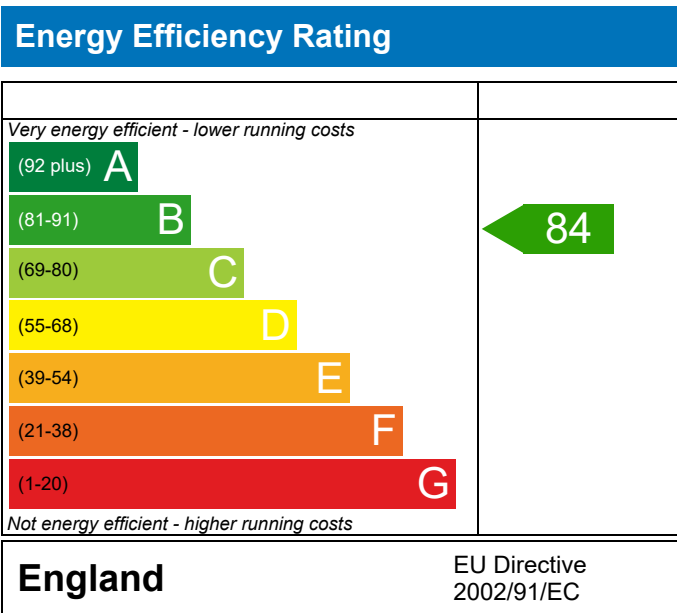


Plot 258

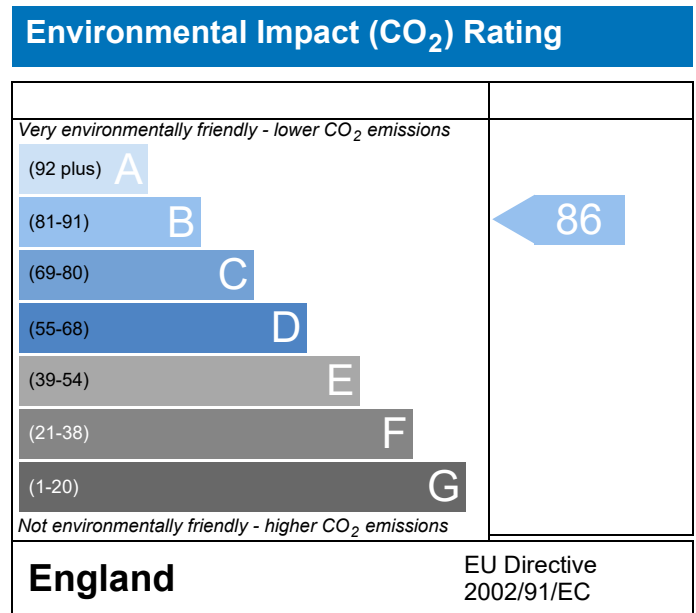
Dwelling type: House, Semi-Detached
 Date of assessment: 14/07/2021
 Produced by: Michael Juckes
 Total floor area: 83.56 m²

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.



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



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

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

BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)



Property Reference	258 - PRJ011511		Issued on Date	14/07/2021	
Assessment Reference	258 S	Prop Type Ref	Sorley		
Property	Plot 258				
SAP Rating	84 B	DER	17.63	TER	18.46
Environmental	86 B	% DER<TER	4.48		
CO ₂ Emissions (t/year)	1.29	DFEE	43.58	TFEE	51.23
General Requirements Compliance	Pass	% DFEE<TFEE	14.93		
Assessor Details	Mr. Michael Juckes, Michael Juckes, Tel: 02033971373, michael@briaryenergy.co.uk			Assessor ID	T850-0001
Client					

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	18.46	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	17.63	kgCO ₂ /m ²	Pass
	-0.83 (-4.5%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	51.23	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	43.58	kWh/m ² /yr	
	-7.6 (-14.8%)	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 (Midlands)

Not significant

Pass

Based on:

Overshading

Average

Windows facing East

4.05 m², No overhang

Windows facing West

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

0.025 W/m²K

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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	258 - PRJ011511	Issued on Date	14/07/2021
Assessment Reference	258 S	Prop Type Ref	Sorley
Property	Plot 258		

SAP Rating	84 B	DER	17.63	TER	18.46
Environmental	86 B	% DER<TER	4.48		
CO ₂ Emissions (t/year)	1.29	DFEE	43.58	TTEE	51.23
General Requirements Compliance	Pass	% DFEE<TTEE	14.93		

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 infilt 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	0.2200	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 (30a)
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 x (25)m x (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	91.7901	91.7901	91.4708	89.9819	89.7056	88.6723	88.4319	88.4319	88.9199	89.7056	89.9819	90.5559 (39)
Average = Sum(39)m / 12 =												89.9532 (39)
HLP	1.0985	1.0985	1.0947	1.0769	1.0735	1.0612	1.0583	1.0583	1.0641	1.0735	1.0769	1.0837 (40)
HLP (average)												1.0765 (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 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)
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 m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
East	4.0500	21.0039	0.4700	0.0000	0.7700	30.7854 (76)						
West	3.8600	21.0039	0.4700	0.0000	0.7700	29.3411 (80)						
Solar gains	60.1265	119.3776	196.9590	292.7052	337.6225	373.2337	342.6678	300.7781	236.8501	145.3997	84.3907	54.6542 (83)
Total gains	637.1911	691.1745	745.5865	805.9802	814.9704	818.8461	770.2086	737.5356	694.4254	638.5427	616.6591	616.2573 (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	32.4753	32.4753	32.5887	33.1279	33.2299	33.6172	33.7085	33.7085	33.5236	33.2299	33.1279	32.9179
alpha	3.1650	3.1650	3.1726	3.2085	3.2153	3.2411	3.2472	3.2472	3.2349	3.2153	3.2085	3.1945
util living area	0.9627	0.9506	0.9213	0.8599	0.7675	0.5970	0.4764	0.5034	0.7205	0.8855	0.9448	0.9661 (86)
MIT	19.2952	19.4611	19.8301	20.2782	20.6268	20.8858	20.9584	20.9500	20.7713	20.2966	19.7531	19.2754 (87)
Th 2	20.0021	20.0021	20.0052	20.0198	20.0225	20.0327	20.0350	20.0350	20.0302	20.0225	20.0198	20.0141 (88)
util rest of house	0.9564	0.9423	0.9075	0.8346	0.7234	0.5238	0.3825	0.4084	0.6576	0.8598	0.9340	0.9603 (89)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

MIT 2	18.4597	18.6224	18.9851	19.4246	19.7460	19.9669	20.0179	20.0137	19.8812	19.4524	18.9251	18.4493 (90)
Living area fraction									fLA = Living area / (4) =			0.1869 (91)
MIT	18.6159	18.7792	19.1431	19.5842	19.9106	20.1387	20.1937	20.1887	20.0476	19.6102	19.0799	18.6037 (92)
Temperature adjustment												-0.1500
adjusted MIT	18.4659	18.6292	18.9931	19.4342	19.7606	19.9887	20.0437	20.0387	19.8976	19.4602	18.9299	18.4537 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9438	0.9277	0.8903	0.8170	0.7102	0.5203	0.3834	0.4088	0.6480	0.8420	0.9189	0.9484 (94)
Useful gains	601.3620	641.2309	663.8048	658.4670	578.7766	426.0213	295.3039	301.5002	449.9895	537.6788	566.6207	584.4747 (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												
1300.2858	1269.3820	1133.6035	938.8852	714.1127	460.0938	304.5311	312.9326	524.4126	803.7806	1064.4729	1290.7565 (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												
519.9993	422.1175	349.5303	201.9011	100.6901	0.0000	0.0000	0.0000	0.0000	197.9798	358.4536	525.4737 (98)	
Space heating												2676.1452 (98)
RHI space heating demand												2676 (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)

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	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)
Effective ac	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)
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				
East		4.0500	19.6403	0.4700	0.0000	0.0000	0.7700	28.7866 (76)					
West		3.8600	19.6403	0.4700	0.0000	0.0000	0.7700	27.4362 (80)					
Solar gains	56.2228	109.9837	181.1275	264.1636	323.7425	331.4080	315.5140	271.0218	210.6588	130.5049	70.1032	46.2349	(83)
Total gains	633.2874	681.7806	729.7550	777.4386	801.0904	777.0205	743.0548	707.7793	668.2341	623.6479	602.3716	607.8380	(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	0.9638	0.9522	0.9275	0.8741	0.7819	0.6377	0.4962	0.5341	0.7345	0.8907	0.9487	0.9676	(86)
MIT	19.2386	19.4224	19.7570	20.2070	20.5885	20.8532	20.9514	20.9376	20.7539	20.2705	19.6939	19.2150	(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	0.9576	0.9439	0.9146	0.8506	0.7390	0.5657	0.3987	0.4372	0.6709	0.8654	0.9385	0.9621	(89)
MIT 2	18.3891	18.5723	18.9022	19.3471	19.7009	19.9350	20.0024	19.9976	19.8571	19.4174	18.8544	18.3761	(90)
Living area fraction	fLA = Living area / (4) =												0.1869 (91)
MIT	18.5479	18.7312	19.0620	19.5079	19.8669	20.1066	20.1798	20.1733	20.0247	19.5769	19.0114	18.5329	(92)
Temperature adjustment													-0.1500
adjusted MIT	18.3979	18.5812	18.9120	19.3579	19.7169	19.9566	20.0298	20.0233	19.8747	19.4269	18.8614	18.3829	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	0.9449	0.9294	0.8975	0.8325	0.7248	0.5604	0.3995	0.4370	0.6605	0.8473	0.9235	0.9503	(94)
Useful gains	598.4078	633.6401	654.9308	647.2074	580.5936	435.4762	296.8227	309.3333	441.3594	528.4478	556.3083	577.6412	(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	1323.1849	1279.1136	1156.0427	956.5891	730.8057	480.5173	307.6711	324.0540	521.2561	804.6463	1079.5758	1311.2175	(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	539.2342	433.7582	372.8273	222.7548	111.7578	0.0000	0.0000	0.0000	0.0000	205.4917	376.7526	545.7808	(98)
Space heating													2808.3572 (98)
Space heating per m ²													(98) / (4) = 33.6089 (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													3103.1572 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	539.2342	433.7582	372.8273	222.7548	111.7578	0.0000	0.0000	0.0000	0.0000	205.4917	376.7526	545.7808	(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)	595.8389	479.2908	411.9638	246.1379	123.4892	0.0000	0.0000	0.0000	0.0000	227.0626	416.3012	603.0727	(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	89.7194	89.6674	89.5459	89.2680	88.7504	87.3000	87.3000	87.3000	87.3000	89.1776	89.5620	87.3000	(216)
Fuel for water heating, kWh/month	187.0446	164.1240	170.6209	150.6803	146.5199	130.1775	122.2555	137.9765	138.9390	156.5520	168.2670	181.5775	(219)
Water heating fuel used													1854.7348 (219)
Annual totals kWh/year													
Space heating fuel - main system													3103.1572 (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													5449.7992 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	3103.1572	3.4800	107.9899 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1854.7348	3.4800	64.5448 (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			357.4172 (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] =	1.1677 (257)
SAP value		83.7111
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	3103.1572	0.2160	670.2819 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1854.7348	0.2160	400.6227 (264)
Space and water heating			1070.9047 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	416.9072	0.5190	216.3748 (268)
Total kg/year			1326.2045 (272)
CO2 emissions per m2			15.8700 (273)
EI value			86.1768
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)	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	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)							
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 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	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 =	91.7901	91.7901	91.4708	89.9819	89.7056	88.6723	88.4319	88.4319	88.9199	89.7056	89.9819	90.5559 (39)
HLP	1.0985	1.0985	1.0947	1.0769	1.0735	1.0612	1.0583	1.0583	1.0641	1.0735	1.0769	1.0837 (40)
HLP (average)												1.0765 (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 m2	Solar flux Table 6a W/m2	Specific data g or Table 6b	Specific data FF or Table 6c	Access factor Table 6d	Gains W					
East			4.0500	21.0039	0.4700	0.0000	0.7700	30.7854 (76)					
West			3.8600	21.0039	0.4700	0.0000	0.7700	29.3411 (80)					
Solar gains	60.1265	119.3776	196.9590	292.7052	337.6225	373.2337	342.6678	300.7781	236.8501	145.3997	84.3907	54.6542	(83)
Total gains	637.1911	691.1745	745.5865	805.9802	814.9704	818.8461	770.2086	737.5356	694.4254	638.5427	616.6591	616.2573	(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	32.4753	32.4753	32.5887	33.1279	33.2299	33.6172	33.7085	33.7085	33.5236	33.2299	33.1279	32.9179	
alpha	3.1650	3.1650	3.1726	3.2085	3.2153	3.2411	3.2472	3.2472	3.2349	3.2153	3.2085	3.1945	
util living area	0.9627	0.9506	0.9213	0.8599	0.7675	0.5970	0.4764	0.5034	0.7205	0.8855	0.9448	0.9661	(86)
MIT	19.2952	19.4611	19.8301	20.2782	20.6268	20.8858	20.9584	20.9500	20.7713	20.2966	19.7531	19.2754	(87)
Th 2	20.0021	20.0021	20.0052	20.0198	20.0225	20.0327	20.0350	20.0350	20.0302	20.0225	20.0198	20.0141	(88)
util rest of house	0.9564	0.9423	0.9075	0.8346	0.7234	0.5238	0.3825	0.4084	0.6576	0.8598	0.9340	0.9603	(89)
MIT 2	18.4597	18.6224	18.9851	19.4246	19.7460	19.9669	20.0179	20.0137	19.8812	19.4524	18.9251	18.4493	(90)
Living area fraction	fLA = Living area / (4) =												0.1869 (91)
MIT	18.6159	18.7792	19.1431	19.5842	19.9106	20.1387	20.1937	20.1887	20.0476	19.6102	19.0799	18.6037	(92)
Temperature adjustment													-0.1500
adjusted MIT	18.4659	18.6292	18.9931	19.4342	19.7606	19.9887	20.0437	20.0387	19.8976	19.4602	18.9299	18.4537	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	0.9438	0.9277	0.8903	0.8170	0.7102	0.5203	0.3834	0.4088	0.6480	0.8420	0.9189	0.9484	(94)
Useful gains	601.3620	641.2309	663.8048	658.4670	578.7766	426.0213	295.3039	301.5002	449.9895	537.6788	566.6207	584.4747	(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	1300.2858	1269.3820	1133.6035	938.8852	714.1127	460.0938	304.5311	312.9326	524.4126	803.7806	1064.4729	1290.7565	(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	519.9993	422.1175	349.5303	201.9011	100.6901	0.0000	0.0000	0.0000	0.0000	197.9798	358.4536	525.4737	(98)
Space heating													2676.1452 (98)
Space heating per m2													(98) / (4) = 32.0266 (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													2957.0665 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	519.9993	422.1175	349.5303	201.9011	100.6901	0.0000	0.0000	0.0000	0.0000	197.9798	358.4536	525.4737	(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)	574.5848	466.4282	386.2213	223.0951	111.2597	0.0000	0.0000	0.0000	0.0000	218.7622	396.0813	580.6339	(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	89.6978	89.6505	89.5021	89.1928	88.6682	87.3000	87.3000	87.3000	87.3000	89.1486	89.5287	87.3000	(216)
Fuel for water heating, kWh/month	187.0897	164.1549	170.7043	150.8075	146.6558	130.1775	122.2555	137.9765	138.9390	156.6029	168.3297	181.6223	(219)
Water heating fuel used													1855.3156 (219)
Annual totals kWh/year													
Space heating fuel - main system													2957.0665 (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													5304.2893 (238)

10a. Fuel costs - using BEDF prices (478)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2957.0665	3.8700	114.4385 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1855.3156	3.8700	71.8007 (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			372.2096 (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	2957.0665	0.2160	638.7264 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1855.3156	0.2160	400.7482 (264)
Space and water heating			1039.4745 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	416.9072	0.5190	216.3748 (268)
Total kg/year			1294.7744 (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	2957.0665	1.2200	3607.6212 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1855.3156	1.2200	2263.4850 (264)
Space and water heating			5871.1061 (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			7381.2613 (272)
Primary energy kWh/m2/year			88.3349 (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 478 TEST (27 May 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	£279	£279	£0
Space heating	£222	£222	£0
Water heating	£72	£72	£0
Lighting	£79	£79	£0
Total cost of fuels	£372	£372	£0
Total cost of uses	£373	£373	£0
Delivered energy	63 kWh/m ²	63 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	88 kWh/m ²	88 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	258 - PRJ011511	Issued on Date	14/07/2021
Assessment Reference	258 S	Prop Type Ref	Sorley
Property	Plot 258		

SAP Rating	84 B	DER	17.63	TER	18.46
Environmental	86 B	% DER<TER	4.48		
CO₂ Emissions (t/year)	1.29	DFEE	43.58	TFEE	51.23
General Requirements Compliance	Pass	% DFEE<TFEE	14.93		

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)	18.46	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	17.63	kgCO ₂ /m ²	Pass
	-0.83 (-4.5%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	51.23	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	43.58	kWh/m ² /yr	
	-7.6 (-14.8%)	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
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Secondary heating system	None	
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5 Cylinder insulation

Hot water storage	No cylinder	
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6 Controls

Space heating controls	Programmer, room thermostat and TRVs	Pass
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Hot water controls	No cylinder	
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Boiler interlock	Yes	Pass
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7 Low energy lights

Percentage of fixed lights with low-energy fittings	100	%	
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Minimum	75	%	Pass
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8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Midlands)	Not significant	Pass
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Based on:

Overshading	Average
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Windows facing East	4.05 m ² , No overhang
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Windows facing West	3.86 m ² , No overhang
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Air change rate	4.00 ach
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Blinds/curtains	Dark-coloured curtain or roller blind, closed 100% of daylight hours
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Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type	U-value	W/m ² K	
Filled Cavity with Edge Sealing	0.00	W/m ² K	Pass

Air permeability and pressure testing

3 Air permeability

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

Party wall U-value	0.00	W/m ² K
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Roof U-value	0.10	W/m ² K
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Thermal bridging γ -value	0.025	W/m ² K
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This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.