

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

Property Reference	049 - PRJ013014	Issued on Date	09/05/2024
Assessment Reference	049	Prop Type Ref	3B
Property	6 Erwood Close, Netley Abbey, Southampton, SO31 5TJ		

SAP Rating	85 B	DER	14.47	TER	17.41
Environmental	88 B	% DER<TER	16.90		
CO ₂ Emissions (t/year)	1.14	DFEE	46.39	TTEE	51.26
General Requirements Compliance	Pass	% DFEE<TFEE	9.50		

Assessor Details	Mr. Christopher Nicholls, Briary Energy Limited, Tel: 0203 397 1373, chris@briaryenergy.co.uk	Assessor ID	U903-0001
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Client	
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CALCULATION OF HEAT DEMAND 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Built) (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	46.9500 (1b)	x 2.3700 (2b)	= 111.2715 (1b) - (3b)
First floor	46.9500 (1c)	x 2.6200 (2c)	= 123.0090 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.9000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 234.2805 (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							3 * 10 =	30.0000 (7a)				
Number of passive vents							0 * 10 =	0.0000 (7b)				
Number of flueless gas fires							0 * 40 =	0.0000 (7c)				
Air changes per hour												
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(7a)+(7b)+(7c) =						30.0000 / (5) =	0.1281 (8)				
Pressure test							Yes					
Measured/design AP50							4.5300					
Infiltration rate							0.3546	(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) =	0.3280 (21)				
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.9000	4.6000	4.5000	4.2000	4.2000	4.1000	4.1000	4.0000	4.0000	4.3000	4.3000	4.4000 (22)
Wind factor	1.2250	1.1500	1.1250	1.0500	1.0500	1.0250	1.0250	1.0000	1.0000	1.0750	1.0750	1.1000 (22a)
Adj infiltr rate	0.4018	0.3772	0.3690	0.3444	0.3444	0.3362	0.3362	0.3280	0.3280	0.3526	0.3526	0.3608 (22b)
Effective ac	0.5807	0.5711	0.5681	0.5593	0.5593	0.5565	0.5565	0.5538	0.5538	0.5621	0.5621	0.5651 (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
Solid Door			2.0900	1.2000	2.5080		(26)
Windows (Uw = 1.40)			17.1600	1.3258	22.7500		(27)
Fir - Ground			46.9540	0.1800	8.4517	75.6000	3549.7224 (28a)
Wl - Brick (Timber Frame)	96.8930	19.2470	77.6460	0.2100	16.3057	7.4000	574.5804 (29a)
Rf - Ins Joist	46.9540		46.9540	0.0800	3.7563	7.4000	347.4596 (30)
Total net area of external elements Aum(A, m ²)			190.8040				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	53.7717		(33)
Party Wall			46.2060	0.0000	0.0000	7.4000	341.9244 (32)
Stud			67.7630			7.4000	501.4465 (32c)
Internal Floor			46.9540			7.4000	347.4596 (32d)
Internal Ceiling			46.9540			7.4000	347.4596 (32e)
Heat capacity Cm = Sum (A x k)							6010.0525 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							64.0048 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							19.1121 (36)
Total fabric heat loss						(33) + (36) =	72.8838 (37)

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

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(38)m	Jan 44.8956	Feb 44.1550	Mar 43.9185	Apr 43.2402	May 43.2402	Jun 43.0246	Jul 43.0246	Aug 42.8141	Sep 42.8141	Oct 43.4611	Nov 43.4611	Dec 43.6872	(38)
Heat transfer coeff	117.7794	117.0388	116.8023	116.1240	116.1240	115.9084	115.9084	115.6979	115.6979	116.3449	116.3449	116.5710	(39)
Average = Sum(39)m / 12 =												116.3618	(39)
HLP	Jan 1.2543	Feb 1.2464	Mar 1.2439	Apr 1.2367	May 1.2367	Jun 1.2344	Jul 1.2344	Aug 1.2321	Sep 1.2321	Oct 1.2390	Nov 1.2390	Dec 1.2414	(40)
HLP (average)												1.2392	(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												2.6754	(42)	
Average daily hot water use (litres/day)												97.7415	(43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use														
	107.5156	103.6060	99.6963	95.7866	91.8770	87.9673	87.9673	91.8770	95.7866	99.6963	103.6060	107.5156	(44)	
Energy conte	159.4425	139.4495	143.8994	125.4549	120.3770	103.8762	96.2566	110.4558	111.7750	130.2630	142.1923	154.4116	(45)	
Energy content (annual)											Total = Sum(45)m =	1537.8538	(45)	
Distribution loss (46)m = 0.15 x (45)m	23.9164	20.9174	21.5849	18.8182	18.0566	15.5814	14.4385	16.5684	16.7663	19.5395	21.3288	23.1617	(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	0.6708	0.6085	0.6456	0.5408	0.4977	0.4112	0.3810	0.4567	0.4818	0.5844	0.6205	0.6497	(61)	
Total heat required for water heating calculated for each month	160.1134	140.0580	144.5449	125.9957	120.8747	104.2874	96.6376	110.9125	112.2568	130.8474	142.8128	155.0613	(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	160.1134	140.0580	144.5449	125.9957	120.8747	104.2874	96.6376	110.9125	112.2568	130.8474	142.8128	155.0613	(64)	
	Total per year (kWh/year) = Sum(64)m =												1544.4025	(64)
RHI water heating demand													1544	(64)
Heat gains from water heating, kWh/month	53.1824	46.5191	48.0079	41.8490	40.1498	34.6416	32.1006	36.8407	37.2856	43.4586	47.4341	51.5043	(65)	

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

Metabolic gains (Table 5), Watts	Jan 160.5258	Feb 160.5258	Mar 160.5258	Apr 160.5258	May 160.5258	Jun 160.5258	Jul 160.5258	Aug 160.5258	Sep 160.5258	Oct 160.5258	Nov 160.5258	Dec 160.5258	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	55.6537	49.4311	40.2001	30.4341	22.7498	19.2064	20.7531	26.9757	36.2068	45.9728	53.6570	57.2005	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	367.2726	371.0838	361.4798	341.0341	315.2252	290.9683	274.7633	270.9522	280.5561	301.0018	326.8108	351.0676	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	(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)	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	(71)
Water heating gains (Table 5)	71.4817	69.2248	64.5268	58.1236	53.9648	48.1134	43.1459	49.5171	51.7856	58.4120	65.8806	69.2262	(72)
Total internal gains	604.6446	599.9763	576.4433	539.8284	502.1763	468.5247	448.8990	457.6816	478.7851	515.6232	556.5851	587.7309	(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
North													5.8820	13.4684	0.7300	0.7200	0.7700	28.8556 (74)
East													6.1670	25.1733	0.7300	0.7200	0.7700	56.5460 (76)
South													5.1080	56.5862	0.7300	0.7200	0.7700	105.2810 (78)
Solar gains	190.6826	287.8278	429.6537	582.7110	652.8326	732.9381	676.0604	616.3061	506.8424	356.1299	230.1304	158.8053	(83)					
Total gains	795.3273	887.8041	1006.0970	1122.5393	1155.0089	1201.4628	1124.9593	1073.9877	985.6275	871.7531	786.7154	746.5362	(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	14.1745	14.2642	14.2930	14.3765	14.3765	14.4033	14.4033	14.4295	14.4295	14.3492	14.3492	14.3214		
alpha	1.9450	1.9509	1.9529	1.9584	1.9584	1.9602	1.9602	1.9620	1.9620	1.9566	1.9566	1.9548		
util living area	0.8749	0.8477	0.7913	0.7009	0.5836	0.4211	0.3118	0.3155	0.5121	0.7099	0.8298	0.8842	(86)	
MIT	18.4376	18.6956	19.2373	19.8816	20.4319	20.8008	20.9257	20.9266	20.6922	20.0825	19.2119	18.4096	(87)	
Th 2	19.8768	19.8830	19.8850	19.8908	19.8908	19.8926	19.8926	19.8944	19.8944	19.8889	19.8889	19.8870	(88)	
util rest of house	0.8605	0.8307	0.7677	0.6662	0.5311	0.3464	0.2163	0.2161	0.4365	0.6660	0.8071	0.8706	(89)	
MIT 2	16.5805	16.9421	17.6964	18.5775	19.2998	19.7351	19.8562	19.8598	19.6299	18.8697	17.6802	16.5463	(90)	

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Living area fraction									fLA = Living area / (4) =		0.1949 (91)	
MIT	16.9424	17.2838	17.9967	18.8317	19.5205	19.9428	20.0646	20.0677	19.8370	19.1060	17.9787	16.9094 (92)
Temperature adjustment												-0.1500
adjusted MIT	16.7924	17.1338	17.8467	18.6817	19.3705	19.7928	19.9146	19.9177	19.6870	18.9560	17.8287	16.7594 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8060	0.7751	0.7139	0.6219	0.5037	0.3392	0.2183	0.2183	0.4208	0.6219	0.7518	0.8172	(94)
Useful gains	641.0501	688.1669	718.2272	698.1291	581.7304	407.4830	245.6122	234.4672	414.7956	542.1797	591.4790	610.0751	(95)
Ext temp.	5.7000	6.1000	7.7000	10.1000	13.1000	15.9000	17.7000	17.8000	15.5000	12.3000	8.8000	5.8000	(96)
Heat loss rate W													
Month fracti	1306.4597	1291.3865	1185.1579	996.5395	728.1510	451.2080	256.6915	245.0111	484.4223	774.3941	1050.4450	1277.5522	(97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating	495.0648	405.3636	347.3964	214.8554	108.9370	0.0000	0.0000	0.0000	0.0000	172.7675	330.4555	496.6030	(98)
RHI space heating demand												2571.4431	(98)
												2571	(98)

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Calculation Type: New Build (As Built)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Built) (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	46.9500 (1b)	x 2.3700 (2b)	= 111.2715 (1b) - (3b)
First floor	46.9500 (1c)	x 2.6200 (2c)	= 123.0090 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.9000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 234.2805 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					3 * 10 = 30.0000 (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) =					30.0000 / (5) = 0.1281 (8)
Pressure test					Yes
Measured/design AP50					4.5300
Infiltration rate					0.3546 (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) =	0.3280 (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	0.4181	0.4100	0.4018	0.3608	0.3526	0.3116	0.3116	0.3034	0.3280	0.3526	0.3690	0.3854 (22b)
Effective ac	0.5874	0.5840	0.5807	0.5651	0.5621	0.5485	0.5485	0.5460	0.5538	0.5621	0.5681	0.5742 (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
Solid Door			2.0900	1.2000	2.5080		(26)
Windows (Uw = 1.40)			17.1600	1.3258	22.7500		(27)
Flr - Ground			46.9540	0.1800	8.4517	75.6000	3549.7224 (28a)
Wl - Brick (Timber Frame)	96.8930	19.2470	77.6460	0.2100	16.3057	7.4000	574.5804 (29a)
Rf - Ins Joist	46.9540		46.9540	0.0800	3.7563	7.4000	347.4596 (30)
Total net area of external elements Aum(A, m ²)			190.8040				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	53.7717		(33)
Party Wall			46.2060	0.0000	0.0000	7.4000	341.9244 (32)
Stud			67.7630			7.4000	501.4465 (32c)
Internal Floor			46.9540			7.4000	347.4596 (32d)
Internal Ceiling			46.9540			7.4000	347.4596 (32e)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 6010.0525 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K 64.0048 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K) 19.1121 (36)
Total fabric heat loss (33) + (36) = 72.8838 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	45.4153	45.1528	44.8956	43.6872	43.4611	42.4087	42.4087	42.2138	42.8141	43.4611	43.9185	44.3966 (38)
Heat transfer coeff	118.2991	118.0366	117.7794	116.5710	116.3449	115.2925	115.2925	115.0976	115.6979	116.3449	116.8023	117.2804 (39)
Average = Sum(39)m / 12 =												116.5699 (39)
HLP	Jan 1.2598	Feb 1.2570	Mar 1.2543	Apr 1.2414	May 1.2390	Jun 1.2278	Jul 1.2278	Aug 1.2257	Sep 1.2321	Oct 1.2390	Nov 1.2439	Dec 1.2490 (40)
HLP (average)												1.2414 (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												2.6754 (42)
Average daily hot water use (litres/day)												97.7415 (43)
Daily hot water use	Jan 107.5156	Feb 103.6060	Mar 99.6963	Apr 95.7866	May 91.8770	Jun 87.9673	Jul 87.9673	Aug 91.8770	Sep 95.7866	Oct 99.6963	Nov 103.6060	Dec 107.5156 (44)
Energy conte	159.4425	139.4495	143.8994	125.4549	120.3770	103.8762	96.2566	110.4558	111.7750	130.2630	142.1923	154.4116 (45)
Energy content (annual)												Total = Sum(45)m = 1537.8538 (45)
Distribution loss (46)m = 0.15 x (45)m												

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Water storage loss:	23.9164	20.9174	21.5849	18.8182	18.0566	15.5814	14.4385	16.5684	16.7663	19.5395	21.3288	23.1617 (46)
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	0.6708	0.6085	0.6456	0.5408	0.4977	0.4112	0.3810	0.4567	0.4818	0.5844	0.6205	0.6497 (61)
Total heat required for water heating calculated for each month	160.1134	140.0580	144.5449	125.9957	120.8747	104.2874	96.6376	110.9125	112.2568	130.8474	142.8128	155.0613 (62)
WWHRS	-52.5105	-46.2025	-47.1557	-38.7982	-36.0249	-29.7187	-25.1519	-30.4531	-31.3416	-38.7444	-44.8802	-50.7538 eq. (G10)
Total of WWHRS savings	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-471.7356
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	107.6029	93.8555	97.3893	87.1975	84.8498	74.5687	71.4857	80.4594	80.9153	92.1030	97.9325	104.3075 (64)
Heat gains from water heating, kWh/month	53.1824	46.5191	48.0079	41.8490	40.1498	34.6416	32.1006	36.8407	37.2856	43.4586	47.4341	51.5043 (65)
												1072.6669 (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	160.5258	160.5258	160.5258	160.5258	160.5258	160.5258	160.5258	160.5258	160.5258	160.5258	160.5258	160.5258	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	55.6537	49.4311	40.2001	30.4341	22.7498	19.2064	20.7531	26.9757	36.2068	45.9728	53.6570	57.2005	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	367.2726	371.0838	361.4798	341.0341	315.2252	290.9683	274.7633	270.9522	280.5561	301.0018	326.8108	351.0676	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	(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)	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	(71)
Water heating gains (Table 5)	71.4817	69.2248	64.5268	58.1236	53.9648	48.1134	43.1459	49.5171	51.7856	58.4120	65.8806	69.2262	(72)
Total internal gains	604.6446	599.9763	576.4433	539.8284	502.1763	468.5247	448.8990	457.6816	478.7851	515.6232	556.5851	587.7309	(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	
North			5.8820		10.6334		0.7300		0.7200		0.7700		22.7817 (74)	
East			6.1670		19.6403		0.7300		0.7200		0.7700		44.1174 (76)	
South			5.1080		46.7521		0.7300		0.7200		0.7700		86.9842 (78)	
Solar gains	153.8832	272.2976	397.5744	531.2127	627.8353	637.0968	608.5329	534.7617	443.8118	307.8848	186.2192	130.4343	(83)	
Total gains	758.5279	872.2739	974.0177	1071.0411	1130.0117	1105.6215	1057.4319	992.4433	922.5969	823.5080	742.8043	718.1651	(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	14.1122	14.1436	14.1745	14.3214	14.3492	14.4802	14.4802	14.5047	14.4295	14.3492	14.2930	14.2348	
alpha	1.9408	1.9429	1.9450	1.9548	1.9566	1.9653	1.9653	1.9670	1.9620	1.9566	1.9529	1.9490	
util living area	0.8978	0.8674	0.8217	0.7476	0.6473	0.5238	0.4133	0.4479	0.6135	0.7786	0.8692	0.9063	(86)
MIT	18.0085	18.3538	18.8980	19.5792	20.1824	20.6280	20.8353	20.8007	20.4565	19.6733	18.7241	17.9363	(87)
Th 2	19.8724	19.8746	19.8768	19.8870	19.8889	19.8978	19.8978	19.8995	19.8944	19.8889	19.8850	19.8810	(88)
util rest of house	0.8865	0.8532	0.8022	0.7187	0.6041	0.4594	0.3272	0.3619	0.5531	0.7468	0.8528	0.8960	(89)
MIT 2	15.9700	16.4559	17.2200	18.1666	18.9782	19.5491	19.7816	19.7515	19.3527	18.3190	16.9934	15.8706	(90)
Living area fraction	16.3673	16.8258	17.5470	18.4419	19.2129	19.7594	19.9870	19.9559	19.5678	18.5829	17.3307	16.2732	(91)
MIT	16.3673	16.8258	17.5470	18.4419	19.2129	19.7594	19.9870	19.9559	19.5678	18.5829	17.3307	16.2732	(92)
Temperature adjustment	16.2173	16.6758	17.3970	18.2919	19.0629	19.6094	19.8370	19.8059	19.4178	18.4329	17.1807	16.1232	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	633.0198	696.1915	727.1457	716.3145	641.0389	487.4187	340.5259	351.2698	482.8008	572.0960	592.7917	607.3017	(94)
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	1409.8029	1389.9720	1283.4420	1094.8251	856.6372	577.5412	373.2001	392.0164	615.2615	911.3232	1177.4490	1398.3597	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh	577.9266	466.2205	413.8844	272.5276	160.4051	0.0000	0.0000	0.0000	0.0000	252.3851	420.9533	588.5472	(98)
Space heating												3152.8498	(98)
Space heating per m2												33.5767	(99)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

8c. Space cooling requirement

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 %)													90.2000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													3495.3989 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	577.9266	466.2205	413.8844	272.5276	160.4051	0.0000	0.0000	0.0000	0.0000	252.3851	420.9533	588.5472	(98)
Space heating efficiency (main heating system 1)	90.2000	90.2000	90.2000	90.2000	90.2000	0.0000	0.0000	0.0000	0.0000	90.2000	90.2000	90.2000	(210)
Space heating fuel (main heating system)	640.7169	516.8742	458.8519	302.1370	177.8327	0.0000	0.0000	0.0000	0.0000	279.8061	466.6888	652.4913	(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	107.6029	93.8555	97.3893	87.1975	84.8498	74.5687	71.4857	80.4594	80.9153	92.1030	97.9325	104.3075	(64)
Efficiency of water heater (217)m	87.7132	87.5499	87.1997	86.4163	84.8948	76.4000	76.4000	76.4000	76.4000	86.0446	87.2264	87.8121	(217)
Fuel for water heating, kWh/month	122.6759	107.2022	111.6853	100.9040	99.9470	97.6030	93.5677	105.3133	105.9100	107.0410	112.2740	118.7848	(219)
Water heating fuel used												1282.9081	(219)
Annual totals kWh/year													
Space heating fuel - main system													3495.3989 (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)													393.1448 (232)
Total delivered energy for all uses													5246.4517 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	3495.3989	3.4800	121.6399 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1282.9081	3.4800	44.6452 (247)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	393.1448	13.1900	51.8558 (250)
Additional standing charges			120.0000 (251)
Total energy cost			348.0334 (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] =	1.0524 (257)
SAP value		85.3195
SAP rating (Section 12)		85 (258)
SAP band		B

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

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	3495.3989	0.2160	755.0062 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1282.9081	0.2160	277.1081 (264)
Space and water heating			1032.1143 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	393.1448	0.5190	204.0422 (268)
Total kg/year			1275.0814 (272)
CO2 emissions per m2			13.5800 (273)
EI value			87.6990
EI rating			88 (274)
EI band			B

Calculation of stars for heating and DHW

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.9020 = 3.858$, stars = 4
Main heating environmental impact	$0.216 \times (1 + 0.29 \times 0.00) / 0.9020 = 0.2395$, stars = 4
Water heating energy efficiency	$3.48 / 0.8337 = 4.174$, stars = 5
Water heating environmental impact	$0.216 / 0.8337 = 0.2591$, stars = 5

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

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

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	46.9500 (1b)	x 2.3700 (2b)	= 111.2715 (1b) - (3b)
First floor	46.9500 (1c)	x 2.6200 (2c)	= 123.0090 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.9000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 234.2805 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					3 * 10 = 30.0000 (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) =					30.0000 / (5) = 0.1281 (8)
Pressure test					Yes
Measured/design AP50					4.5300
Infiltration rate					0.3546 (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) =	0.3280 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.9000	4.6000	4.5000	4.2000	4.2000	4.1000	4.1000	4.0000	4.0000	4.3000	4.3000	4.4000 (22)
Wind factor	1.2250	1.1500	1.1250	1.0500	1.0500	1.0250	1.0250	1.0000	1.0000	1.0750	1.0750	1.1000 (22a)
Adj infilt rate	0.4018	0.3772	0.3690	0.3444	0.3444	0.3362	0.3362	0.3280	0.3280	0.3526	0.3526	0.3608 (22b)
Effective ac	0.5807	0.5711	0.5681	0.5593	0.5593	0.5565	0.5565	0.5538	0.5538	0.5621	0.5621	0.5651 (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
Solid Door			2.0900	1.2000	2.5080		(26)
Windows (Uw = 1.40)			17.1600	1.3258	22.7500		(27)
Flr - Ground			46.9540	0.1800	8.4517	75.6000	3549.7224 (28a)
Wl - Brick (Timber Frame)	96.8930	19.2470	77.6460	0.2100	16.3057	7.4000	574.5804 (29a)
Rf - Ins Joist	46.9540		46.9540	0.0800	3.7563	7.4000	347.4596 (30)
Total net area of external elements Aum(A, m ²)			190.8040				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	53.7717		(33)
Party Wall			46.2060	0.0000	0.0000	7.4000	341.9244 (32)
Stud			67.7630			7.4000	501.4465 (32c)
Internal Floor			46.9540			7.4000	347.4596 (32d)
Internal Ceiling			46.9540			7.4000	347.4596 (32e)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 6010.0525 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							64.0048 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							19.1121 (36)
Total fabric heat loss							(33) + (36) = 72.8838 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	44.8956	44.1550	43.9185	43.2402	43.2402	43.0246	43.0246	42.8141	42.8141	43.4611	43.4611	43.6872 (38)
Heat transfer coeff	117.7794	117.0388	116.8023	116.1240	116.1240	115.9084	115.9084	115.6979	115.6979	116.3449	116.3449	116.5710 (39)
Average = Sum(39)m / 12 =												116.3618 (39)
HLP	1.2543	1.2464	1.2439	1.2367	1.2367	1.2344	1.2344	1.2321	1.2321	1.2390	1.2390	1.2414 (40)
HLP (average)												1.2392 (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												2.6754 (42)
Average daily hot water use (litres/day)												97.7415 (43)
Daily hot water use	107.5156	103.6060	99.6963	95.7866	91.8770	87.9673	87.9673	91.8770	95.7866	99.6963	103.6060	107.5156 (44)
Energy conte	159.4425	139.4495	143.8994	125.4549	120.3770	103.8762	96.2566	110.4558	111.7750	130.2630	142.1923	154.4116 (45)
Energy content (annual)												Total = Sum(45)m = 1537.8538 (45)
Distribution loss (46)m = 0.15 x (45)m												

Water storage loss:	23.9164	20.9174	21.5849	18.8182	18.0566	15.5814	14.4385	16.5684	16.7663	19.5395	21.3288	23.1617 (46)
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	0.6708	0.6085	0.6456	0.5408	0.4977	0.4112	0.3810	0.4567	0.4818	0.5844	0.6205	0.6497 (61)
Total heat required for water heating calculated for each month	160.1134	140.0580	144.5449	125.9957	120.8747	104.2874	96.6376	110.9125	112.2568	130.8474	142.8128	155.0613 (62)
WWHRS	-52.5105	-46.2025	-47.1557	-38.7982	-36.0249	-29.7187	-25.1519	-30.4531	-31.3416	-38.7444	-44.8802	-50.7538 eq. (G10)
Total of WWHRS savings	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-471.7356
Solar input								Solar input	(sum of months)	= Sum(63)m		0.0000 (63)
Output from w/h	107.6029	93.8555	97.3893	87.1975	84.8498	74.5687	71.4857	80.4594	80.9153	92.1030	97.9325	104.3075 (64)
Heat gains from water heating, kWh/month	53.1824	46.5191	48.0079	41.8490	40.1498	34.6416	32.1006	36.8407	37.2856	43.4586	47.4341	51.5043 (65)
								Total per year (kWh/year)	= Sum(64)m			1072.6669 (64)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	160.5258	160.5258	160.5258	160.5258	160.5258	160.5258	160.5258	160.5258	160.5258	160.5258	160.5258	160.5258 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	55.6537	49.4311	40.2001	30.4341	22.7498	19.2064	20.7531	26.9757	36.2068	45.9728	53.6570	57.2005 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	367.2726	371.0838	361.4798	341.0341	315.2252	290.9683	274.7633	270.9522	280.5561	301.0018	326.8108	351.0676 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280	53.7280 (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)	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172	-107.0172 (71)
Water heating gains (Table 5)	71.4817	69.2248	64.5268	58.1236	53.9648	48.1134	43.1459	49.5171	51.7856	58.4120	65.8806	69.2262 (72)
Total internal gains	604.6446	599.9763	576.4433	539.8284	502.1763	468.5247	448.8990	457.6816	478.7851	515.6232	556.5851	587.7309 (73)

[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
North	5.8820	13.4684	0.7300	0.7200	0.7700	28.8556 (74)
East	6.1670	25.1733	0.7300	0.7200	0.7700	56.5460 (76)
South	5.1080	56.5862	0.7300	0.7200	0.7700	105.2810 (78)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

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

8c. Space cooling requirement

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 %)													90.2000	(206)
Efficiency of secondary/supplementary heating system, %													0.0000	(208)
Space heating requirement													2850.8239	(211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Space heating requirement	495.0648	405.3636	347.3964	214.8554	108.9370	0.0000	0.0000	0.0000	0.0000	172.7675	330.4555	496.6030	(98)	
Space heating efficiency (main heating system 1)	90.2000	90.2000	90.2000	90.2000	90.2000	0.0000	0.0000	0.0000	0.0000	90.2000	90.2000	90.2000	(210)	
Space heating fuel (main heating system)	548.8523	449.4053	385.1401	238.1989	120.7727	0.0000	0.0000	0.0000	0.0000	191.5383	366.3586	550.5577	(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	107.6029	93.8555	97.3893	87.1975	84.8498	74.5687	71.4857	80.4594	80.9153	92.1030	97.9325	104.3075	(64)	
Efficiency of water heater (217)m	87.3819	87.2375	86.7683	85.7297	83.5891	76.4000	76.4000	76.4000	76.4000	84.8694	86.6231	87.4579	(216)	
Fuel for water heating, kWh/month	123.1409	107.5861	112.2406	101.7121	101.5082	97.6030	93.5677	105.3133	105.9100	108.5232	113.0560	119.2660	(219)	
Water heating fuel used												1289.4271	(219)	
Annual totals kWh/year														
Space heating fuel - main system													2850.8239	(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)													393.1448	(232)
Total delivered energy for all uses													4608.3958	(238)

10a. Fuel costs - using BEDF prices (542)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2850.8239	7.6100	216.9477 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1289.4271	7.6100	98.1254 (247)
Pumps and fans for heating	75.0000	31.0800	23.3100 (249)
Energy for lighting	393.1448	31.0800	122.1894 (250)
Additional standing charges			105.0000 (251)
Total energy cost			565.5725 (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	2850.8239	0.2160	615.7780 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1289.4271	0.2160	278.5163 (264)
Space and water heating			894.2942 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	393.1448	0.5190	204.0422 (268)
Total kg/year			1137.2614 (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	2850.8239	1.2200	3478.0051 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1289.4271	1.2200	1573.1011 (264)
Space and water heating			5051.1062 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	393.1448	3.0700	1206.9545 (268)
Primary energy kWh/year			6488.3108 (272)
Primary energy kWh/m2/year			69.0981 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating:
Current environmental impact rating:

B 85
B 88

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

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	SAP increase too small
O	Not considered
P	Not considered
R	Not considered
S	Not considered
T	Not considered
U Solar photovoltaic panels	Recommended
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:	SAP change	Cost change	CO2 change
U Solar photovoltaic panels	+ 9.6	-£ 605	-1010 kg (88.8%)
Measures omitted - SAP change or cost saving too small:			
N Solar water heating	+ 0.9	-£ 46	-148 kg (13.0%)

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
Solar photovoltaic panels	£605 10.76 kg/m²	A 95	A 96
Total Savings	£605 10.76 kg/m²		
Potential energy efficiency rating:		A 95	
Potential environmental impact rating:			A 96

Fuel prices for cost data on this page from database revision number 542 TEST (30 Apr 2024)
Recommendation texts revision number 4.9c (22 Feb 2014)

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

	Current	Potential	Saving
Electricity	£145	£145	£0
Mains gas	£420	£420	£0
Space heating	£345	£345	£0
Water heating	£98	£98	£0
Lighting	£122	£122	£0
Generated (PV)	-£0	-£605	£605
Total cost of fuels	£565	-£40	£605
Total cost of uses	£565	-£40	£605
Delivered energy	49 kWh/m²	28 kWh/m²	21 kWh/m²
Carbon dioxide emissions	1.1 tonnes	0.1 tonnes	1.0 tonnes
CO2 emissions per m²	12 kg/m²	1 kg/m²	11 kg/m²
Primary energy	69 kWh/m²	5 kWh/m²	64 kWh/m²

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	46.9500 (1b)	x 2.3700 (2b)	= 111.2715 (1b) - (3b)
First floor	46.9500 (1c)	x 2.6200 (2c)	= 123.0090 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.9000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 234.2805 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					3 * 10 = 30.0000 (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)					30.0000 / (5) = 0.1281 (8)
Pressure test					Yes
Measured/design AP50					4.5300
Infiltration rate					0.3546 (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) =	0.3280 (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	0.4181	0.4100	0.4018	0.3608	0.3526	0.3116	0.3116	0.3034	0.3280	0.3526	0.3690	0.3854 (22b)
Effective ac	0.5874	0.5840	0.5807	0.5651	0.5621	0.5485	0.5485	0.5460	0.5538	0.5621	0.5681	0.5742 (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
Solid Door			2.0900	1.2000	2.5080		(26)
Windows (Uw = 1.40)			17.1600	1.3258	22.7500		(27)
Flr - Ground			46.9540	0.1800	8.4517	75.6000	3549.7224 (28a)
Wl - Brick (Timber Frame)	96.8930	19.2470	77.6460	0.2100	16.3057	7.4000	574.5804 (29a)
Rf - Ins Joist	46.9540		46.9540	0.0800	3.7563	7.4000	347.4596 (30)
Total net area of external elements Aum(A, m ²)			190.8040				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	53.7717		(33)
Party Wall			46.2060	0.0000	0.0000	7.4000	341.9244 (32)
Stud			67.7630			7.4000	501.4465 (32c)
Internal Floor			46.9540			7.4000	347.4596 (32d)
Internal Ceiling			46.9540			7.4000	347.4596 (32e)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 6010.0525 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K 64.0048 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K) 19.1121 (36)
Total fabric heat loss (33) + (36) = 72.8838 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	45.4153	45.1528	44.8956	43.6872	43.4611	42.4087	42.4087	42.2138	42.8141	43.4611	43.9185	44.3966 (38)
Heat transfer coeff	118.2991	118.0366	117.7794	116.5710	116.3449	115.2925	115.2925	115.0976	115.6979	116.3449	116.8023	117.2804 (39)
Average = Sum(39)m / 12 =												116.5699 (39)
HLP	Jan 1.2598	Feb 1.2570	Mar 1.2543	Apr 1.2414	May 1.2390	Jun 1.2278	Jul 1.2278	Aug 1.2257	Sep 1.2321	Oct 1.2390	Nov 1.2439	Dec 1.2490 (40)
HLP (average)												1.2414 (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												2.6754 (42)
Average daily hot water use (litres/day)												97.7415 (43)
Daily hot water use	Jan 107.5156	Feb 103.6060	Mar 99.6963	Apr 95.7866	May 91.8770	Jun 87.9673	Jul 87.9673	Aug 91.8770	Sep 95.7866	Oct 99.6963	Nov 103.6060	Dec 107.5156 (44)
Energy conte	159.4425	139.4495	143.8994	125.4549	120.3770	103.8762	96.2566	110.4558	111.7750	130.2630	142.1923	154.4116 (45)
Energy content (annual)												Total = Sum(45)m = 1537.8538 (45)
Distribution loss (46)m = 0.15 x (45)m												

Water storage loss:	23.9164	20.9174	21.5849	18.8182	18.0566	15.5814	14.4385	16.5684	16.7663	19.5395	21.3288	23.1617 (46)
Total storage loss												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	0.6708	0.6085	0.6456	0.5408	0.4977	0.4112	0.3810	0.4567	0.4818	0.5844	0.6205	0.6497 (61)
Total heat required for water heating calculated for each month												
	160.1134	140.0580	144.5449	125.9957	120.8747	104.2874	96.6376	110.9125	112.2568	130.8474	142.8128	155.0613 (62)
WWHRS	-52.5105	-46.2025	-47.1557	-38.7982	-36.0249	-29.7187	-25.1519	-30.4531	-31.3416	-38.7444	-44.8802	-50.7538 eq. (G10)
Total of WWHRS savings												-471.7356
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	107.6029	93.8555	97.3893	87.1975	84.8498	74.5687	71.4857	80.4594	80.9153	92.1030	97.9325	104.3075 (64)
								Total per year (kWh/year) =	Sum(64)m =			1072.6669 (64)
Heat gains from water heating, kWh/month												
	53.1824	46.5191	48.0079	41.8490	40.1498	34.6416	32.1006	36.8407	37.2856	43.4586	47.4341	51.5043 (65)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8345	0.7981	0.7465	0.6688	0.5673	0.4409	0.3220	0.3539	0.5233	0.6947	0.7980	0.8456 (94)
Useful gains	633.0198	696.1915	727.1457	716.3145	641.0389	487.4187	340.5259	351.2698	482.8008	572.0960	592.7917	607.3017 (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	1409.8029	1389.9720	1283.4420	1094.8251	856.6372	577.5412	373.2001	392.0164	615.2615	911.3232	1177.4490	1398.3597 (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	577.9266	466.2205	413.8844	272.5276	160.4051	0.0000	0.0000	0.0000	0.0000	252.3851	420.9533	588.5472 (98)
Space heating												3152.8498 (98)
Space heating per m2												33.5767 (99)
										(98) / (4) =		

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

8c. Space cooling requirement

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 %)													90.2000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													3495.3989 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	577.9266	466.2205	413.8844	272.5276	160.4051	0.0000	0.0000	0.0000	0.0000	252.3851	420.9533	588.5472	(98)
Space heating efficiency (main heating system 1)	90.2000	90.2000	90.2000	90.2000	90.2000	0.0000	0.0000	0.0000	0.0000	90.2000	90.2000	90.2000	(210)
Space heating fuel (main heating system)	640.7169	516.8742	458.8519	302.1370	177.8327	0.0000	0.0000	0.0000	0.0000	279.8061	466.6888	652.4913	(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	107.6029	93.8555	97.3893	87.1975	84.8498	74.5687	71.4857	80.4594	80.9153	92.1030	97.9325	104.3075	(64)
Efficiency of water heater (217)m	87.7132	87.5499	87.1997	86.4163	84.8948	76.4000	76.4000	76.4000	76.4000	86.0446	87.2264	87.8121	(217)
Fuel for water heating, kWh/month	122.6759	107.2022	111.6853	100.9040	99.9470	97.6030	93.5677	105.3133	105.9100	107.0410	112.2740	118.7848	(219)
Water heating fuel used												1282.9081	(219)
Annual totals kWh/year													
Space heating fuel - main system													3495.3989 (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)													393.1448 (232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV Unit 0 (0.80 * 2.50 * 1080 * 0.80) =										-1727.2394			-1727.2394 (233)
Total delivered energy for all uses													3519.2123 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	3495.3989	3.4800	121.6399 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1282.9081	3.4800	44.6452 (247)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	393.1448	13.1900	51.8558 (250)
Additional standing charges			120.0000 (251)
Energy saving/generation technologies			
PV Unit	-1727.2394	13.1900	-227.8229 (252)
Total energy cost			120.2105 (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] =	0.3635 (257)
SAP value		94.9293
SAP rating (Section 12)		95 (258)
SAP band		A

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	3495.3989	0.2160	755.0062 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1282.9081	0.2160	277.1081 (264)
Space and water heating			1032.1143 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	393.1448	0.5190	204.0422 (268)
Energy saving/generation technologies			
PV Unit	-1727.2394	0.5190	-896.4372 (269)
Total kg/year			378.6442 (272)
CO2 emissions per m2			4.0300 (273)
EI value			96.3471
EI rating			96 (274)
EI band			A

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

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

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	46.9500 (1b)	x 2.3700 (2b)	= 111.2715 (1b) - (3b)
First floor	46.9500 (1c)	x 2.6200 (2c)	= 123.0090 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.9000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 234.2805 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					3 * 10 = 30.0000 (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) =					30.0000 / (5) = 0.1281 (8)
Pressure test					Yes
Measured/design AP50					4.5300
Infiltration rate					0.3546 (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) =	0.3280 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.9000	4.6000	4.5000	4.2000	4.2000	4.1000	4.1000	4.0000	4.0000	4.3000	4.3000	4.4000 (22)
Wind factor	1.2250	1.1500	1.1250	1.0500	1.0500	1.0250	1.0250	1.0000	1.0000	1.0750	1.0750	1.1000 (22a)
Adj infilt rate	0.4018	0.3772	0.3690	0.3444	0.3444	0.3362	0.3362	0.3280	0.3280	0.3526	0.3526	0.3608 (22b)
Effective ac	0.5807	0.5711	0.5681	0.5593	0.5593	0.5565	0.5565	0.5538	0.5538	0.5621	0.5621	0.5651 (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
Solid Door			2.0900	1.2000	2.5080		(26)
Windows (Uw = 1.40)			17.1600	1.3258	22.7500		(27)
Flr - Ground			46.9540	0.1800	8.4517	75.6000	3549.7224 (28a)
Wl - Brick (Timber Frame)	96.8930	19.2470	77.6460	0.2100	16.3057	7.4000	574.5804 (29a)
Rf - Ins Joist	46.9540		46.9540	0.0800	3.7563	7.4000	347.4596 (30)
Total net area of external elements Aum(A, m ²)			190.8040				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	53.7717		(33)
Party Wall			46.2060	0.0000	0.0000	7.4000	341.9244 (32)
Stud			67.7630			7.4000	501.4465 (32c)
Internal Floor			46.9540			7.4000	347.4596 (32d)
Internal Ceiling			46.9540			7.4000	347.4596 (32e)

Heat capacity Cm = Sum(A x k)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Total fabric heat loss

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	44.8956	44.1550	43.9185	43.2402	43.2402	43.0246	43.0246	42.8141	42.8141	43.4611	43.4611	43.6872 (38)
Heat transfer coeff	117.7794	117.0388	116.8023	116.1240	116.1240	115.9084	115.9084	115.6979	115.6979	116.3449	116.3449	116.5710 (39)
Average = Sum(39)m / 12 =												116.3618 (39)

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.2543	1.2464	1.2439	1.2367	1.2367	1.2344	1.2344	1.2321	1.2321	1.2390	1.2390	1.2414 (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												2.6754 (42)
Average daily hot water use (litres/day)												97.7415 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	107.5156	103.6060	99.6963	95.7866	91.8770	87.9673	87.9673	91.8770	95.7866	99.6963	103.6060	107.5156 (44)
Energy conte	159.4425	139.4495	143.8994	125.4549	120.3770	103.8762	96.2566	110.4558	111.7750	130.2630	142.1923	154.4116 (45)
Energy content (annual)												Total = Sum(45)m = 1537.8538 (45)
Distribution loss (46)m = 0.15 x (45)m												

Water storage loss:	23.9164	20.9174	21.5849	18.8182	18.0566	15.5814	14.4385	16.5684	16.7663	19.5395	21.3288	23.1617 (46)
Total storage loss												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	0.6708	0.6085	0.6456	0.5408	0.4977	0.4112	0.3810	0.4567	0.4818	0.5844	0.6205	0.6497 (61)
Total heat required for water heating calculated for each month												
	160.1134	140.0580	144.5449	125.9957	120.8747	104.2874	96.6376	110.9125	112.2568	130.8474	142.8128	155.0613 (62)
WWHRS	-52.5105	-46.2025	-47.1557	-38.7982	-36.0249	-29.7187	-25.1519	-30.4531	-31.3416	-38.7444	-44.8802	-50.7538 eq. (G10)
Total of WWHRS savings												-471.7356
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	107.6029	93.8555	97.3893	87.1975	84.8498	74.5687	71.4857	80.4594	80.9153	92.1030	97.9325	104.3075 (64)
								Total per year (kWh/year) =	Sum(64)m =			1072.6669 (64)
Heat gains from water heating, kWh/month												
	53.1824	46.5191	48.0079	41.8490	40.1498	34.6416	32.1006	36.8407	37.2856	43.4586	47.4341	51.5043 (65)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8060	0.7751	0.7139	0.6219	0.5037	0.3392	0.2183	0.2183	0.4208	0.6219	0.7518	0.8172 (94)
Useful gains	641.0501	688.1669	718.2272	698.1291	581.7304	407.4830	245.6122	234.4672	414.7956	542.1797	591.4790	610.0751 (95)
Ext temp.	5.7000	6.1000	7.7000	10.1000	13.1000	15.9000	17.7000	17.8000	15.5000	12.3000	8.8000	5.8000 (96)
Heat loss rate W	1306.4597	1291.3865	1185.1579	996.5395	728.1510	451.2080	256.6915	245.0111	484.4223	774.3941	1050.4450	1277.5522 (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	495.0648	405.3636	347.3964	214.8554	108.9370	0.0000	0.0000	0.0000	0.0000	172.7675	330.4555	496.6030 (98)
Space heating												2571.4431 (98)
Space heating per m2												27.3849 (99)
										(98) / (4) =		

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

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

8c. Space cooling requirement

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 %)													90.2000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													2850.8239 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	495.0648	405.3636	347.3964	214.8554	108.9370	0.0000	0.0000	0.0000	0.0000	172.7675	330.4555	496.6030	(98)
Space heating efficiency (main heating system 1)	90.2000	90.2000	90.2000	90.2000	90.2000	0.0000	0.0000	0.0000	0.0000	90.2000	90.2000	90.2000	(210)
Space heating fuel (main heating system)	548.8523	449.4053	385.1401	238.1989	120.7727	0.0000	0.0000	0.0000	0.0000	191.5383	366.3586	550.5577	(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													
Water heating requirement	107.6029	93.8555	97.3893	87.1975	84.8498	74.5687	71.4857	80.4594	80.9153	92.1030	97.9325	104.3075	(64)
Efficiency of water heater (217)m	87.3819	87.2375	86.7683	85.7297	83.5891	76.4000	76.4000	76.4000	76.4000	84.8694	86.6231	87.4579	(217)
Fuel for water heating, kWh/month	123.1409	107.5861	112.2406	101.7121	101.5082	97.6030	93.5677	105.3133	105.9100	108.5232	113.0560	119.2660	(219)
Water heating fuel used													(219)
Annual totals kWh/year													
Space heating fuel - main system													2850.8239 (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)													393.1448 (232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV Unit 0 (0.80 * 2.50 * 1217 * 0.80) =										-1946.4459			-1946.4459 (233)
Total delivered energy for all uses													2661.9499 (238)

10a. Fuel costs - using BEDF prices (542)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2850.8239	7.6100	216.9477 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1289.4271	7.6100	98.1254 (247)
Pumps and fans for heating	75.0000	31.0800	23.3100 (249)
Energy for lighting	393.1448	31.0800	122.1894 (250)
Additional standing charges			105.0000 (251)
Energy saving/generation technologies			
PV Unit	-1946.4459	31.0800	-604.9554 (252)
Total energy cost			-39.3829 (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	2850.8239	0.2160	615.7780 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1289.4271	0.2160	278.5163 (264)
Space and water heating			894.2942 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	393.1448	0.5190	204.0422 (268)
Energy saving/generation technologies			
PV Unit	-1946.4459	0.5190	-1010.2054 (269)
Total kg/year			127.0559 (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	2850.8239	1.2200	3478.0051 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1289.4271	1.2200	1573.1011 (264)
Space and water heating			5051.1062 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	393.1448	3.0700	1206.9545 (268)
Energy saving/generation technologies			
PV Unit	-1946.4459	3.0700	-5975.5890 (269)
Primary energy kWh/year			512.7217 (272)
Primary energy kWh/m2/year			5.4603 (273)

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Built)

Property Reference	049 - PRJ013014	Issued on Date	09/05/2024
Assessment Reference	049	Prop Type Ref	3B
Property	6 Erwood Close, Netley Abbey, Southampton, SO31 5TJ		
SAP Rating	85 B	DER	14.47
Environmental	88 B	TER	17.41
CO ₂ Emissions (t/year)	1.14	% DER<TER	16.90
General Requirements Compliance	Pass	DFEE	46.39
		TFEE	51.26
		% DFEE<TFEE	9.50
Assessor Details	Mr. Christopher Nicholls, Briary Energy Limited, Tel: 0203 397 1373, chris@briaryenergy.co.uk		Assessor ID
			U903-0001
Client			

SUMMARY FOR INPUT DATA FOR New Build (As Built)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	17.41	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	14.47	kgCO ₂ /m ²	Pass
	-2.94 (-16.9%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	51.26	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	46.39	kWh/m ² /yr	
	-4.9 (-9.6%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.21 (max. 0.30)	0.21 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.18 (max. 0.25)	0.18 (max. 0.70)	Pass
Roof	0.08 (max. 0.20)	0.08 (max. 0.35)	Pass
Openings	1.38 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	4.53 (measured in this dwelling)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Built)

Main heating system

Boiler system with radiators or underfloor - Mains gas
Data from database
Vaillant ecoFIT sustain 835 VUW 356/6-3 (H-GB)
Combi boiler
Efficiency: 89.3% SEDBUK2009
Minimum: 88.0%

Pass

Secondary heating system

None

5 Cylinder insulation

Hot water storage

No cylinder

6 Controls

Space heating controls

Time and temperature zone control

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 (Southern England)

Slight

Pass

Based on:

Overshading

Average

Windows facing North

5.88 m², No overhang

Windows facing East

6.17 m², No overhang

Windows facing South

5.11 m², No overhang

Air change rate

4.65 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

4.53 (measured in this dwelling)

Maximum

10.0

Pass

10 Key features

Party wall U-value

0.00 W/m²K

Roof U-value

0.08 W/m²K