

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

Property Reference	083 - PRJ013014				Issued on Date	03/06/2025
Assessment Reference	083	Prop Type Ref	D-SP			
Property	1 Erwood Close, Netley Abbey, Southampton, SO31 5TJ					
SAP Rating	85 B	DER	14.45	TER	17.10	
Environmental	88 B	% DER<TER	15.49			
CO ₂ Emissions (t/year)	1.16	DFEE	47.02	TFEE	51.14	
General Requirements Compliance	Pass	% DFEE<TFEE	8.07			
Assessor Details	Mr. Christopher Nicholls, Briary Energy Limited, Tel: 0203 397 1373, chris@briaryenergy.co.uk				Assessor ID	4299-0004
Client						

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REGULATIONS COMPLIANCE REPORT - Approved Document L1A, 2013 Edition, England

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DWELLING AS BUILT

Semi-Detached House, total floor area 96 m²

This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating:Mains gas

Fuel factor:1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.10 kgCO₂/m²

Dwelling Carbon Dioxide Emission Rate (DER) 14.45 kgCO₂/m²OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)51.1 kWh/m²/yr

Dwelling Fabric Energy Efficiency (DFEE)47.0 kWh/m²/yrOK

2 Fabric U-values

Element	Average	Highest	
External wall	0.21 (max. 0.30)	0.21 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.18 (max. 0.25)	0.18 (max. 0.70)	OK
Roof	0.08 (max. 0.20)	0.17 (max. 0.35)	OK
Openings	1.38 (max. 2.00)	1.40 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals: 3.93 (measured in this dwelling)
Maximum 10.0 OK

4 Heating efficiency

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% OK

Secondary heating system:

None

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

Space heating controls: Time and temperature zone control OK

Hot water controls:

No cylinder

Boiler interlock

Yes

OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings:100%
Minimum 75% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Southern England): Slight OK

Based on:

Overshading:

Average

Windows facing North East: 0.81 m², No overhang

Windows facing South East: 6.05 m², No overhang

Windows facing South West: 8.37 m², No overhang

Windows facing North West: 6.16 m², No overhang

Air change rate: 4.68 ach

Blinds/curtains: Dark-coloured curtain or roller blind, closed 100% of daylight hours

10 Key features

Party wall U-value 0.00 W/m²K

Roof U-value 0.08 W/m²K

Air permeability 3.9 m³/m²h

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CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Built) (Version 9.92, January 2014)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	48.5500 (1b)	x 2.3600 (2b)	= 114.5780 (1b) - (3b)
First floor	47.3200 (1c)	x 2.6300 (2c)	= 124.4516 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	95.8700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 239.0296 (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					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) = 0.1673 (8)
Pressure test					Yes
Measured/design AP50					3.9300
Infiltration rate					0.3638 (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) =		0.3366 (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	0.4291	0.4207	0.4123	0.3702	0.3618	0.3197	0.3197	0.3113	0.3366	0.3618	0.3786	0.3955 (22b)
Effective ac	0.5921	0.5885	0.5850	0.5685	0.5654	0.5511	0.5511	0.5485	0.5566	0.5654	0.5717	0.5782 (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			2.0400	1.2000	2.4480		(26)
Windows (Uw = 1.40)			21.4000	1.3258	28.3580		(27)
Flr - Ground			48.5530	0.1800	8.7395	75.6000	3670.6068 (28a)
Wl - Brick (Timber Frame)	61.8070	17.9090	43.8980	0.2100	9.2186	7.4000	324.8452 (29a)
Wl - Clad (Timber Frame)	38.8060	5.5240	33.2820	0.2100	6.9892	7.4000	246.2868 (29a)
Rf - Ins Joist	47.3200		47.3200	0.0800	3.7856	7.4000	350.1680 (30)
Rf - Flat over Bay	1.2330		1.2330	0.1700	0.2096	7.4000	9.1242 (30)
Total net area of external elements Aum(A, m ²)			197.7160				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	59.7485		(33)
Party Wall			43.9660	0.0000	0.0000	7.4000	325.3484 (32)
Stud			76.2760			7.4000	564.4425 (32c)
Internal Floor			47.3200			7.4000	350.1680 (32d)
Internal Ceiling			47.3200			7.4000	350.1680 (32e)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 6191.1579 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							64.5787 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							20.9223 (36)
Total fabric heat loss							(33) + (36) = 80.6708 (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	46.7021	46.4201	46.1437	44.8454	44.6024	43.4716	43.4716	43.2622	43.9072	44.6024	45.0938	45.6076 (38)
Heat transfer coeff	127.3729	127.0909	126.8145	125.5162	125.2732	124.1425	124.1425	123.9330	124.5780	125.2732	125.7647	126.2784 (39)
Average = Sum(39)m / 12 =												125.5150 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.3286	1.3257	1.3228	1.3092	1.3067	1.2949	1.2949	1.2927	1.2994	1.3067	1.3118	1.3172 (40)
HLP (average)												1.3092 (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												2.6979 (42)
Average daily hot water use (litres/day)												98.2742 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	108.1017	104.1707	100.2397	96.3088	92.3778	88.4468	88.4468	92.3778	96.3088	100.2397	104.1707	108.1017 (44)
Energy conte	160.3117	140.2096	144.6837	126.1388	121.0332	104.4424	96.7813	111.0579	112.3843	130.9731	142.9673	155.2533 (45)

Energy content (annual)												Total = Sum(45)m =	1546.2366 (45)
Distribution loss (46)m = 0.15 x (45)m													
	24.0467	21.0314	21.7026	18.9208	18.1550	15.6664	14.5172	16.6587	16.8576	19.6460	21.4451	23.2880 (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	0.6707	0.6087	0.6508	0.5467	0.5031	0.4157	0.3852	0.4617	0.4871	0.5892	0.6206	0.6496 (61)	
Total heat required for water heating calculated for each month													
	160.9824	140.8183	145.3346	126.6855	121.5363	104.8581	97.1665	111.5196	112.8714	131.5622	143.5880	155.9028 (62)	
WWHRS	-52.8897	-46.5364	-47.4963	-39.0773	-36.2834	-29.9315	-25.3312	-30.6705	-31.5656	-39.0222	-45.2032	-51.1206 eq. (G10)	
Total of WWHRS savings												-475.1281	
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	108.0926	94.2819	97.8383	87.6082	85.2529	74.9266	71.8353	80.8491	81.3057	92.5400	98.3847	104.7822 (64)	
												Total per year (kWh/year) = Sum(64)m =	1077.6976 (64)
Heat gains from water heating, kWh/month	53.4713	46.7719	48.2701	42.0778	40.3693	34.8310	32.2761	37.0422	37.4895	43.6958	47.6918	51.7841 (65)	

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	134.8932	134.8932	134.8932	134.8932	134.8932	134.8932	134.8932	134.8932	134.8932	134.8932	134.8932	134.8932 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.2407	19.7540	16.0650	12.1623	9.0914	7.6754	8.2935	10.7802	14.4692	18.3719	21.4428	22.8588 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	249.4730	252.0617	245.5382	231.6503	214.1193	197.6426	186.6352	184.0465	190.5701	204.4579	221.9889	238.4656 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4893	36.4893	36.4893	36.4893	36.4893	36.4893	36.4893	36.4893	36.4893	36.4893	36.4893	36.4893 (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)	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145 (71)
Water heating gains (Table 5)	71.8700	69.6010	64.8791	58.4414	54.2598	48.3764	43.3818	49.7879	52.0688	58.7310	66.2386	69.6023 (72)
Total internal gains	410.0516	407.8846	392.9502	368.7219	343.9385	320.1624	304.7785	311.0825	323.5760	348.0288	376.1383	397.3946 (73)

[Jan					Area	Solar flux		g	FF	Access		Gains
					m2	Table 6a	Specific data		Specific data	factor		W
						W/m2	or Table 6b		or Table 6c	Table 6d		
Northeast					0.8120	11.2829		0.7300	0.7200	0.7700		3.3371 (75)
Southeast					6.0470	36.7938		0.7300	0.7200	0.7700		81.0408 (77)
Southwest					8.3730	36.7938		0.7300	0.7200	0.7700		112.2134 (79)
Northwest					6.1640	11.2829		0.7300	0.7200	0.7700		25.3322 (81)
Solar gains	221.9235	387.5406	555.5442	730.7432	857.1913	868.0145	829.7748	732.8365	615.8074	435.1349	267.5474	188.7981 (83)
Total gains	631.9751	795.4252	948.4944	1099.4650	1201.1298	1188.1769	1134.5533	1043.9190	939.3834	783.1637	643.6856	586.1927 (84)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, n _{l,m} (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	13.5018	13.5318	13.5613	13.7016	13.7281	13.8532	13.8532	13.8766	13.8047	13.7281	13.6745	13.6188
alpha	1.9001	1.9021	1.9041	1.9134	1.9152	1.9235	1.9235	1.9251	1.9203	1.9152	1.9116	1.9079
util living area	0.9278	0.8917	0.8392	0.7560	0.6469	0.5210	0.4121	0.4529	0.6280	0.8054	0.9010	0.9363 (86)
MIT	17.6306	18.0727	18.7137	19.4836	20.1432	20.6105	20.8253	20.7837	20.4027	19.5160	18.4265	17.5436 (87)
Th 2	19.8185	19.8208	19.8230	19.8336	19.8356	19.8448	19.8448	19.8465	19.8413	19.8356	19.8316	19.8274 (88)
util rest of house	0.9191	0.8791	0.8203	0.7266	0.6019	0.4539	0.3222	0.3625	0.5653	0.7748	0.8873	0.9285 (89)
MIT 2	15.4240	16.0465	16.9450	18.0108	18.8929	19.4870	19.7256	19.6903	19.2530	18.0846	16.5619	15.3028 (90)
Living area fraction									f _{LA} = Living area / (4) =			0.1967 (91)
MIT	15.8581	16.4451	17.2930	18.3005	19.1389	19.7080	19.9419	19.9054	19.4792	18.3662	16.9287	15.7436 (92)
Temperature adjustment												-0.1500
adjusted MIT	15.7081	16.2951	17.1430	18.1505	18.9889	19.5580	19.7919	19.7554	19.3292	18.2162	16.7787	15.5936 (93)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8724	0.8251	0.7631	0.6745	0.5643	0.4355	0.3178	0.3546	0.5332	0.7195	0.8348	0.8847 (94)
Useful gains	551.3598	656.2831	723.7970	741.6045	677.7668	517.4540	360.5147	370.2242	500.8670	563.4789	537.3196	518.5964 (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	1453.0819	1448.2157	1349.6831	1161.0892	913.1030	615.4974	396.2530	415.8501	651.4407	954.1087	1217.2388	1438.7683 (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	670.8812	532.1787	465.6593	302.0290	175.0901	0.0000	0.0000	0.0000	0.0000	290.6285	489.5419	684.6079 (98)
Space heating												3610.6166 (98)
Space heating per m2												37.6616 (99)
										(98) / (4) =		

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CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 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													4002.9008 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	670.8812	532.1787	465.6593	302.0290	175.0901	0.0000	0.0000	0.0000	0.0000	290.6285	489.5419	684.6079	(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)	743.7708	589.9986	516.2520	334.8437	194.1132	0.0000	0.0000	0.0000	0.0000	322.2046	542.7293	758.9888	(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	108.0926	94.2819	97.8383	87.6082	85.2529	74.9266	71.8353	80.8491	81.3057	92.5400	98.3847	104.7822	(64)
Efficiency of water heater (217)m	87.9945	87.8129	87.4572	86.6796	85.1627	76.4000	76.4000	76.4000	76.4000	86.4296	87.5535	76.4000	(216)
Fuel for water heating, kWh/month	122.8403	107.3668	111.8699	101.0712	100.1060	98.0714	94.0252	105.8234	106.4211	107.0698	112.3709	118.9518	(219)
Water heating fuel used													1285.9880 (219)
Annual totals kWh/year													
Space heating fuel - main system													4002.9008 (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)													392.7777 (232)
Total delivered energy for all uses													5756.6665 (238)

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	4002.9008	0.2160	864.6266	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1285.9880	0.2160	277.7734	(264)
Space and water heating			1142.4000	(265)
Pumps and fans	75.0000	0.5190	38.9250	(267)
Energy for lighting	392.7777	0.5190	203.8516	(268)
Total CO2, kg/year			1385.1766	(272)
Dwelling Carbon Dioxide Emission Rate (DER)			14.4500	(273)

16 CO2 EMISSIONS ASSOCIATED WITH APPLIANCES AND COOKING AND SITE-WIDE ELECTRICITY GENERATION TECHNOLOGIES

DER			14.4500	ZC1
Total Floor Area		TFA	95.8700	
Assumed number of occupants		N	2.6979	
CO2 emission factor in Table 12 for electricity displaced from grid		EF	0.5190	
CO2 emissions from appliances, equation (L14)			15.4201	ZC2
CO2 emissions from cooking, equation (L16)			1.9166	ZC3
Total CO2 emissions			31.7867	ZC4
Residual CO2 emissions offset from biofuel CHP			0.0000	ZC5
Additional allowable electricity generation, kWh/m²/year			0.0000	ZC6
Resulting CO2 emissions offset from additional allowable electricity generation			0.0000	ZC7
Net CO2 emissions			31.7867	ZC8

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CALCULATION OF TARGET EMISSIONS 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Built) (Version 9.92, January 2014)
CALCULATION OF TARGET EMISSIONS 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	48.5500 (1b)	x 2.3600 (2b)	= 114.5780 (1b) - (3b)
First floor	47.3200 (1c)	x 2.6300 (2c)	= 124.4516 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	95.8700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 239.0296 (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) = 0.1255 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3755 (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) =	0.3473 (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	0.4429	0.4342	0.4255	0.3821	0.3734	0.3300	0.3300	0.3213	0.3473	0.3734	0.3908	0.4081 (22b)
Effective ac	0.5981	0.5943	0.5905	0.5730	0.5697	0.5544	0.5544	0.5516	0.5603	0.5697	0.5763	0.5833 (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
TER Opaque door			2.0400	1.0000	2.0400		(26)
TER Opening Type (Uw = 1.40)			21.4000	1.3258	28.3580		(27)
Flr - Ground			48.5530	0.1300	6.3119		(28a)
Wl - Brick (Timber Frame)	61.8070	17.9090	43.8980	0.1800	7.9016		(29a)
Wl - Clad (Timber Frame)	38.8060	5.5240	33.2820	0.1800	5.9908		(29a)
Rf - Ins Joist	47.3200		47.3200	0.1300	6.1516		(30)
Rf - Flat over Bay	1.2330		1.2330	0.1300	0.1603		(30)
Total net area of external elements Aum(A, m ²)			197.7160				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		56.9141		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							11.5662 (36)
Total fabric heat loss						(33) + (36) =	68.4803 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	47.1752	46.8748	46.5804	45.1975	44.9388	43.7343	43.7343	43.5112	44.1982	44.9388	45.4622	46.0094 (38)
Heat transfer coeff	115.6555	115.3551	115.0607	113.6778	113.4191	112.2146	112.2146	111.9916	112.6786	113.4191	113.9425	114.4897 (39)
Average = Sum(39)m / 12 =												113.6766 (39)
HLP	1.2064	1.2032	1.2002	1.1857	1.1831	1.1705	1.1705	1.1682	1.1753	1.1831	1.1885	1.1942 (40)
HLP (average)												1.1857 (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												2.6979 (42)
Average daily hot water use (litres/day)												98.2742 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	108.1017	104.1707	100.2397	96.3088	92.3778	88.4468	88.4468	92.3778	96.3088	100.2397	104.1707	108.1017 (44)
Energy conte	160.3117	140.2096	144.6837	126.1388	121.0332	104.4424	96.7813	111.0579	112.3843	130.9731	142.9673	155.2533 (45)
Energy content (annual)											Total = Sum(45)m =	1546.2366 (45)
Distribution loss	(46)m = 0.15 x (45)m											
	24.0467	21.0314	21.7026	18.9208	18.1550	15.6664	14.5172	16.6587	16.8576	19.6460	21.4451	23.2880 (46)
Water storage loss:												
Total storage loss:												

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Calculation Type: New Build (As Built)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

	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	50.9589	46.0274	50.9589	47.4947	47.0747	43.6176	45.0715	47.0747	47.4947	50.9589	49.3151	50.9589 (61)
Total heat required for water heating calculated for each month	211.2706	186.2370	195.6427	173.6335	168.1079	148.0600	141.8528	158.1326	159.8790	181.9320	192.2824	206.2122 (62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	211.2706	186.2370	195.6427	173.6335	168.1079	148.0600	141.8528	158.1326	159.8790	181.9320	192.2824	206.2122 (64)
Heat gains from water heating, kWh/month	66.0434	58.1265	60.8471	53.8148	52.0122	45.6315	43.4477	48.6954	49.2415	56.2883	59.8654	64.3614 (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)
(66)m	134.8932	134.8932	134.8932	134.8932	134.8932	134.8932	134.8932	134.8932	134.8932	134.8932	134.8932	134.8932	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.2403	19.7536	16.0647	12.1620	9.0913	7.6752	8.2933	10.7800	14.4689	18.3716	21.4424	22.8584	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	249.4730	252.0617	245.5382	231.6503	214.1193	197.6426	186.6352	184.0465	190.5701	204.4579	221.9889	238.4656	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.4893	36.4893	36.4893	36.4893	36.4893	36.4893	36.4893	36.4893	36.4893	36.4893	36.4893	36.4893	(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)	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	(71)
Water heating gains (Table 5)	88.7679	86.4978	81.7837	74.7428	69.9089	63.3771	58.3974	65.4509	68.3909	75.6563	83.1464	86.5073	(72)
Total internal gains	426.9491	424.7811	409.8545	385.0230	359.5874	335.1629	319.7939	326.7453	339.8978	364.9538	393.0456	414.2992	(73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d		Gains W	
Northeast					0.8120	11.2829	0.6300	0.7000	0.7700		2.7999 (75)	
Southeast					6.0470	36.7938	0.6300	0.7000	0.7700		67.9965 (77)	
Southwest					8.3730	36.7938	0.6300	0.7000	0.7700		94.1517 (79)	
Northwest					6.1640	11.2829	0.6300	0.7000	0.7700		21.2548 (81)	
Solar gains	186.2029	325.1625	466.1244	613.1236	719.2187	728.2998	696.2152	614.8800	516.6877	365.0961	224.4832	158.4094 (83)
Total gains	613.1521	749.9436	875.9789	998.1466	1078.8061	1063.4627	1016.0091	941.6252	856.5855	730.0498	617.5289	572.7086 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (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	57.5644	57.7143	57.8620	58.5659	58.6995	59.3295	59.3295	59.4477	59.0852	58.6995	58.4298	58.1505	
alpha	4.8376	4.8476	4.8575	4.9044	4.9133	4.9553	4.9553	4.9632	4.9390	4.9133	4.8953	4.8767	
util living area	0.9973	0.9926	0.9787	0.9330	0.8214	0.6406	0.4789	0.5343	0.7889	0.9617	0.9939	0.9981	(86)
MIT	19.7201	19.9203	20.2127	20.5676	20.8358	20.9640	20.9930	20.9883	20.9008	20.5350	20.0564	19.6863	(87)
Th 2	19.9149	19.9174	19.9199	19.9314	19.9336	19.9437	19.9437	19.9456	19.9398	19.9336	19.9292	19.9246	(88)
util rest of house	0.9964	0.9901	0.9714	0.9100	0.7659	0.5490	0.3676	0.4183	0.7070	0.9438	0.9914	0.9974	(89)
MIT 2	18.2178	18.5109	18.9343	19.4386	19.7801	19.9211	19.9412	19.9410	19.8649	19.4064	18.7188	18.1753	(90)
Living area fraction	18.5133	18.7882	19.1858	19.6607	19.9878	20.1262	20.1481	20.1470	20.0687	19.6285	18.9819	18.4725	(92)
Temperature adjustment	18.5133	18.7882	19.1858	19.6607	19.9878	20.1262	20.1481	20.1470	20.0687	19.6285	18.9819	18.4725	(93)
adjusted MIT	18.5133	18.7882	19.1858	19.6607	19.9878	20.1262	20.1481	20.1470	20.0687	19.6285	18.9819	18.4725	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9947	0.9864	0.9648	0.9029	0.7690	0.5656	0.3896	0.4411	0.7181	0.9370	0.9882	0.9961	(94)
Useful gains	609.8840	739.7582	845.1010	901.2290	829.6510	601.5217	395.8117	415.3889	615.1450	684.0848	610.2588	570.4651	(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	1643.8496	1602.0715	1459.6371	1223.2507	939.9953	620.1255	398.1540	419.6358	672.5473	1023.9990	1353.8539	1634.0570	(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	769.2704	579.4746	457.2148	231.8556	82.0962	0.0000	0.0000	0.0000	0.0000	252.8962	535.3885	791.3123	(98)
Space heating												3699.5086	(98)
Space heating per m2												38.5888	(99)

8c. Space cooling requirement

Not applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

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 %)													93.4000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													3960.9300 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	769.2704	579.4746	457.2148	231.8556	82.0962	0.0000	0.0000	0.0000	0.0000	252.8962	535.3885	791.3123	(98)
Space heating efficiency (main heating system 1)	93.4000	93.4000	93.4000	93.4000	93.4000	0.0000	0.0000	0.0000	0.0000	93.4000	93.4000	93.4000	(210)
Space heating fuel (main heating system)	823.6300	620.4225	489.5234	248.2394	87.8974	0.0000	0.0000	0.0000	0.0000	270.7668	573.2211	847.2295	(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	211.2706	186.2370	195.6427	173.6335	168.1079	148.0600	141.8528	158.1326	159.8790	181.9320	192.2824	206.2122	(64)
Efficiency of water heater (217)m	88.0147	87.7166	87.1164	85.7800	83.3557	80.3000	80.3000	80.3000	80.3000	85.8805	87.4921	88.1090	(216)
Fuel for water heating, kWh/month	240.0400	212.3167	224.5762	202.4174	201.6752	184.3836	176.6535	196.9273	199.1022	211.8432	219.7712	234.0420	(219)
Water heating fuel used												2503.7485	(219)
Annual totals kWh/year													
Space heating fuel - main system												3960.9300	(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)												392.7701	(232)
Total delivered energy for all uses												6932.4486	(238)

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	3960.9300	0.2160	855.5609 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2503.7485	0.2160	540.8097 (264)
Space and water heating			1396.3705 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	392.7701	0.5190	203.8477 (268)
Total CO2, kg/m2/year			1639.1432 (272)
Emissions per m2 for space and water heating			14.5653 (272a)
Fuel factor (mains gas)			1.0000
Emissions per m2 for lighting			2.1263 (272b)
Emissions per m2 for pumps and fans			0.4060 (272c)
Target Carbon Dioxide Emission Rate (TER) = (14.5653 * 1.00) + 2.1263 + 0.4060, rounded to 2 d.p.			17.1000 (273)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

Property Reference	083 - PRJ013014	Issued on Date	03/06/2025
Assessment Reference	083	Prop Type Ref	D-SP
Property	1 Erwood Close, Netley Abbey, Southampton, SO31 5TJ		

SAP Rating	85 B	DER	14.45	TER	17.10
Environmental	88 B	% DER<TER	15.49		
CO ₂ Emissions (t/year)	1.16	DFEE	47.02	TTEE	51.14
General Requirements Compliance	Pass	% DFEE<TFEE	8.07		

Assessor Details	Mr. Christopher Nicholls, Briary Energy Limited, Tel: 0203 397 1373, chris@briaryenergy.co.uk	Assessor ID	4299-0004
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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	48.5500 (1b)	x 2.3600 (2b)	= 114.5780 (1b) - (3b)
First floor	47.3200 (1c)	x 2.6300 (2c)	= 124.4516 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	95.8700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 239.0296 (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)					
							Air changes per hour					
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(7a)+(7b)+(7c) =					40.0000 / (5) =	0.1673 (8)					
Pressure test						Yes						
Measured/design AP50							3.9300					
Infiltration rate							0.3638 (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) =	0.3366 (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	0.4123	0.3870	0.3786	0.3534	0.3534	0.3450	0.3450	0.3366	0.3366	0.3618	0.3618	0.3702 (22b)
Effective ac	0.5850	0.5749	0.5717	0.5624	0.5624	0.5595	0.5595	0.5566	0.5566	0.5654	0.5654	0.5685 (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			2.0400	1.2000	2.4480		(26)
Windows (Uw = 1.40)			21.4000	1.3258	28.3580		(27)
Floor - Ground			48.5530	0.1800	8.7395	75.6000	3670.6068 (28a)
W1 - Brick (Timber Frame)	61.8070	17.9090	43.8980	0.2100	9.2186	7.4000	324.8452 (29a)
W1 - Clad (Timber Frame)	38.8060	5.5240	33.2820	0.2100	6.9892	7.4000	246.2868 (29a)
RF - Ins Joist	47.3200		47.3200	0.0800	3.7856	7.4000	350.1680 (30a)
RF - Flat over Bay	1.2330		1.2330	0.1700	0.2096	7.4000	9.1242 (30)
Total net area of external elements Aum(A, m ²)			197.7160				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	59.7485		(33)
Party Wall			43.9660	0.0000	0.0000	7.4000	325.3484 (32)
Stud			76.2760			7.4000	564.4425 (32c)
Internal Floor			47.3200			7.4000	350.1680 (32d)
Internal Ceiling			47.3200			7.4000	350.1680 (32e)
Heat capacity Cm = Sum (A x k)							(28)...(30) + (32) + (32a)...(32e) = 6191.1579 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							64.5787 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							20.9223 (36)
Total fabric heat loss							(33) + (36) = 80.6708 (37)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

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	46.1437	45.3479	45.0938	44.3651	44.3651	44.1334	44.1334	43.9072	43.9072	44.6024	44.6024	44.8454	(38)
Heat transfer coeff	126.8145	126.0187	125.7647	125.0359	125.0359	124.8042	124.8042	124.5780	124.5780	125.2732	125.2732	125.5162	(39)
Average = Sum(39)m / 12 =												125.2914	(39)
HLP	1.3228	1.3145	1.3118	1.3042	1.3042	1.3018	1.3018	1.2994	1.2994	1.3067	1.3067	1.3092	(40)
HLP (average)												1.3069	(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													2.6979	(42)
Average daily hot water use (litres/day)													98.2742	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use	108.1017	104.1707	100.2397	96.3088	92.3778	88.4468	88.4468	92.3778	96.3088	100.2397	104.1707	108.1017	(44)	
Energy conte	160.3117	140.2096	144.6837	126.1388	121.0332	104.4424	96.7813	111.0579	112.3843	130.9731	142.9673	155.2533	(45)	
Energy content (annual)										Total = Sum(45)m =		1546.2366	(45)	
Distribution loss (46)m = 0.15 x (45)m	24.0467	21.0314	21.7026	18.9208	18.1550	15.6664	14.5172	16.6587	16.8576	19.6460	21.4451	23.2880	(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	0.6707	0.6087	0.6508	0.5467	0.5031	0.4157	0.3852	0.4617	0.4871	0.5892	0.6206	0.6496	(61)	
Total heat required for water heating calculated for each month	160.9824	140.8183	145.3346	126.6855	121.5363	104.8581	97.1665	111.5196	112.8714	131.5622	143.5880	155.9028	(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	160.9824	140.8183	145.3346	126.6855	121.5363	104.8581	97.1665	111.5196	112.8714	131.5622	143.5880	155.9028	(64)	
RHI water heating demand										Total per year (kWh/year) = Sum(64)m =		1552.8256	(64)	
Heat gains from water heating, kWh/month	53.4713	46.7719	48.2701	42.0778	40.3693	34.8310	32.2761	37.0422	37.4895	43.6958	47.6918	51.7841	(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	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	(66)	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	55.6017	49.3850	40.1626	30.4056	22.7286	19.1884	20.7338	26.9505	36.1729	45.9299	53.6069	57.1471	(67)	
Appliances gains (calculated in Appendix L3, equation L13 or L13a), also see Table 5	372.3477	376.2115	366.4749	345.7467	319.5810	294.9890	278.5601	274.6962	284.4329	305.1611	331.3267	355.9187	(68)	
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	(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)	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	(71)	
Water heating gains (Table 5)	71.8700	69.6010	64.8791	58.4414	54.2598	48.3764	43.3818	49.7879	52.0688	58.7310	66.2386	69.6023	(72)	
Total internal gains	610.6618	606.0398	582.3588	545.4360	507.4117	473.3962	453.5179	462.2770	483.5170	520.6642	562.0146	593.5104	(73)	

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c		Access factor Table 6d		Gains W	
Northeast				0.8120	14.6130	0.7300	0.7200		0.7700		4.3220 (75)	
Southeast				6.0470	45.0642	0.7300	0.7200		0.7700		99.2567 (77)	
Southwest				8.3730	45.0642	0.7300	0.7200		0.7700		137.4362 (79)	
Northwest				6.1640	14.6130	0.7300	0.7200		0.7700		32.8089 (81)	
Solar gains	273.8239	407.8284	597.9812	799.4842	890.0968	997.7342	920.8612	842.8381	700.7943	501.1211	329.2010	228.9105 (83)
Total gains	884.4856	1013.8681	1180.3401	1344.9202	1397.5085	1471.1304	1374.3791	1305.1150	1184.3113	1021.7853	891.2156	822.4210 (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)														
tau	13.5613	13.6469	13.6745	13.7542	13.7542	13.7797	13.7797	13.8047	13.8047	13.7281	13.7281	13.7016		
alpha	1.9041	1.9098	1.9116	1.9169	1.9169	1.9186	1.9186	1.9203	1.9203	1.9152	1.9152	1.9134		
util living area	0.8642	0.8299	0.7629	0.6615	0.5394	0.3788	0.2782	0.2830	0.4717	0.6779	0.8127	0.8756	(86)	
MIT	18.4219	18.7197	19.2989	19.9540	20.4829	20.8247	20.9348	20.9351	20.7196	20.1230	19.2247	18.3803	(87)	
Th 2	19.8230	19.8295	19.8316	19.8375	19.8375	19.8394	19.8394	19.8413	19.8413	19.8356	19.8356	19.8336	(88)	

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF HEAT DEMAND 09 Jan 2014

util rest of house	0.8484	0.8109	0.7367	0.6240	0.4852	0.3059	0.1875	0.1880	0.3954	0.6307	0.7877	0.8607 (89)
MIT 2	16.5374	16.9508	17.7487	18.6323	19.3138	19.7065	19.8096	19.8127	19.6094	18.8822	17.6701	16.4849 (90)
Living area fraction									fLA = Living area / (4) =			0.1967 (91)
MIT	16.9081	17.2988	18.0536	18.8923	19.5438	19.9265	20.0309	20.0335	19.8278	19.1263	17.9759	16.8578 (92)
Temperature adjustment												-0.1500
adjusted MIT	16.7581	17.1488	17.9036	18.7423	19.3938	19.7765	19.8809	19.8835	19.6778	18.9763	17.8259	16.7078 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.7919	0.7539	0.6836	0.5834	0.4624	0.3017	0.1909	0.1916	0.3836	0.5896	0.7317	0.8053	(94)
Useful gains	700.4030	764.3651	806.8978	784.6825	646.2573	443.7999	262.3362	250.1236	454.3134	602.4652	652.0628	662.3078	(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	1402.3265	1392.3495	1283.2563	1080.5994	786.9542	483.7981	272.1907	259.5625	520.4678	836.3599	1130.7076	1369.1052	(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	522.2311	422.0056	354.4107	213.0602	104.6785	0.0000	0.0000	0.0000	0.0000	174.0177	344.6243	525.8573	(98)
Space heating												2660.8854	(98)
RHI space heating demand												2661	(98)

FULL SAP CALCULATION PRINTOUT

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	48.5500 (1b)	x 2.3600 (2b)	= 114.5780 (1b) - (3b)
First floor	47.3200 (1c)	x 2.6300 (2c)	= 124.4516 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	95.8700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 239.0296 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					4 * 10 = 40.0000 (7a)
Number of passive vents					0 * 10 = 0.0000 (7b)
Number of flueless gas fires					0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =					40.0000 / (5) = 0.1673 (8)
Pressure test					Yes
Measured/design AP50					3.9300
Infiltration rate					0.3638 (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) =	0.3366 (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	0.4291	0.4207	0.4123	0.3702	0.3618	0.3197	0.3197	0.3113	0.3366	0.3618	0.3786	0.3955 (22b)
Effective ac	0.5921	0.5885	0.5850	0.5685	0.5654	0.5511	0.5511	0.5485	0.5566	0.5654	0.5717	0.5782 (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			2.0400	1.2000	2.4480		(26)
Windows (Uw = 1.40)			21.4000	1.3258	28.3580		(27)
Flr - Ground			48.5530	0.1800	8.7395	75.6000	3670.6068 (28a)
Wl - Brick (Timber Frame)	61.8070	17.9090	43.8980	0.2100	9.2186	7.4000	324.8452 (29a)
Wl - Clad (Timber Frame)	38.8060	5.5240	33.2820	0.2100	6.9892	7.4000	246.2868 (29a)
Rf - Ins Joist	47.3200		47.3200	0.0800	3.7856	7.4000	350.1680 (30)
Rf - Flat over Bay	1.2330		1.2330	0.1700	0.2096	7.4000	9.1242 (30)
Total net area of external elements Aum(A, m ²)			197.7160				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	59.7485		(33)
Party Wall			43.9660	0.0000	0.0000	7.4000	325.3484 (32)
Stud			76.2760			7.4000	564.4425 (32c)
Internal Floor			47.3200			7.4000	350.1680 (32d)
Internal Ceiling			47.3200			7.4000	350.1680 (32e)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 6191.1579 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							64.5787 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							20.9223 (36)
Total fabric heat loss							(33) + (36) = 80.6708 (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	46.7021	46.4201	46.1437	44.8454	44.6024	43.4716	43.4716	43.2622	43.9072	44.6024	45.0938	45.6076 (38)
Heat transfer coeff	127.3729	127.0909	126.8145	125.5162	125.2732	124.1425	124.1425	123.9330	124.5780	125.2732	125.7647	126.2784 (39)
Average = Sum(39)m / 12 =												125.5150 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.3286	1.3257	1.3228	1.3092	1.3067	1.2949	1.2949	1.2927	1.2994	1.3067	1.3118	1.3172 (40)
HLP (average)												1.3092 (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												2.6979 (42)
Average daily hot water use (litres/day)												98.2742 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	108.1017	104.1707	100.2397	96.3088	92.3778	88.4468	88.4468	92.3778	96.3088	100.2397	104.1707	108.1017 (44)
Energy conte	160.3117	140.2096	144.6837	126.1388	121.0332	104.4424	96.7813	111.0579	112.3843	130.9731	142.9673	155.2533 (45)

Energy content (annual)												Total = Sum(45)m =	1546.2366 (45)
Distribution loss (46)m = 0.15 x (45)m													
	24.0467	21.0314	21.7026	18.9208	18.1550	15.6664	14.5172	16.6587	16.8576	19.6460	21.4451	23.2880 (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	0.6707	0.6087	0.6508	0.5467	0.5031	0.4157	0.3852	0.4617	0.4871	0.5892	0.6206	0.6496 (61)	
Total heat required for water heating calculated for each month	160.9824	140.8183	145.3346	126.6855	121.5363	104.8581	97.1665	111.5196	112.8714	131.5622	143.5880	155.9028 (62)	
WWHRS	-52.8827	-46.5364	-47.4963	-39.0773	-36.2834	-29.9315	-25.3312	-30.6705	-31.5656	-39.0222	-45.2032	-51.1206 eq. (G10)	
Total of WWHRS savings												-475.1281	
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 (64)	
Output from w/h	108.0926	94.2819	97.8383	87.6082	85.2529	74.9266	71.8353	80.8491	81.3057	92.5400	98.3847	104.7822 (63)	
								Total per year (kWh/year) =	Sum(64)m =			1077.6976 (64)	
Heat gains from water heating, kWh/month	53.4713	46.7719	48.2701	42.0778	40.3693	34.8310	32.2761	37.0422	37.4895	43.6958	47.6918	51.7841 (65)	

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	55.6017	49.3850	40.1626	30.4056	22.7286	19.1884	20.7338	26.9505	36.1729	45.9299	53.6069	57.1471 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	372.3477	376.2115	366.4749	345.7467	319.5810	294.9890	278.5601	274.6962	284.4329	305.1611	331.3267	355.9187 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850 (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)	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145 (71)
Water heating gains (Table 5)	71.8700	69.6010	64.8791	58.4414	54.2598	48.3764	43.3818	49.7879	52.0688	58.7310	66.2386	69.6023 (72)
Total internal gains	610.6618	606.0398	582.3588	545.4360	507.4117	473.3962	453.5179	462.2770	483.5170	520.6642	562.0146	593.5104 (73)

[Jan					Area	Solar flux		g	FF		Access		Gains	
					m2	Table 6a			Specific data		factor		W	
						W/m2			or Table 6b		or Table 6c		Table 6d	
Northeast					0.8120	11.2829		0.7300	0.7200		0.7700		3.3371 (75)	
Southeast					6.0470	36.7938		0.7300	0.7200		0.7700		81.0408 (77)	
Southwest					8.3730	36.7938		0.7300	0.7200		0.7700		112.2134 (79)	
Northwest					6.1640	11.2829		0.7300	0.7200		0.7700		25.3322 (81)	

Solar gains	221.9235	387.5406	555.5442	730.7432	857.1913	868.0145	829.7748	732.8365	615.8074	435.1349	267.5474	188.7981	(83)	
Total gains	832.5853	993.5804	1137.9030	1276.1792	1364.6030	1341.4107	1283.2928	1195.1135	1099.3243	955.7991	829.5620	782.3085	(84)	

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, n _{li,m} (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	13.5018	13.5318	13.5613	13.7016	13.7281	13.8532	13.8532	13.8766	13.8047	13.7281	13.6745	13.6188
alpha	1.9001	1.9021	1.9041	1.9134	1.9152	1.9235	1.9235	1.9251	1.9203	1.9152	1.9116	1.9079
util living area	0.8904	0.8516	0.7967	0.7121	0.6040	0.4798	0.3741	0.4092	0.5745	0.7525	0.8573	0.9004 (86)
MIT	17.9695	18.3723	18.9561	19.6547	20.2474	20.6650	20.8532	20.8200	20.4948	19.7114	18.7156	17.8855 (87)
Th 2	19.8185	19.8208	19.8230	19.8336	19.8356	19.8448	19.8448	19.8465	19.8413	19.8356	19.8316	19.8274 (88)
util rest of house	0.8781	0.8356	0.7747	0.6803	0.5582	0.4146	0.2899	0.3241	0.5113	0.7175	0.8392	0.8892 (89)
MIT 2	15.8971	16.4595	17.2717	18.2313	19.0163	19.5411	19.7463	19.7189	19.3523	18.3362	16.9587	15.7819 (90)
Living area fraction									f _{LA} = Living area / (4) =			0.1967 (91)
MIT	16.3048	16.8358	17.6031	18.5113	19.2585	19.7622	19.9640	19.9355	19.5771	18.6067	17.3044	16.1957 (92)
Temperature adjustment												-0.1500
adjusted MIT	16.1548	16.6858	17.4531	18.3613	19.1085	19.6122	19.8140	19.7855	19.4271	18.4567	17.1544	16.0457 (93)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8239	0.7785	0.7187	0.6329	0.5261	0.4004	0.2875	0.3192	0.4859	0.6666	0.7826	0.8367 (94)
Useful gains	685.9905	773.4884	817.7805	807.6781	717.8674	537.0931	368.9482	381.4996	534.2120	637.0964	649.2503	654.5677 (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	1509.9752	1497.8669	1389.0119	1187.5514	928.0817	622.2246	398.9974	419.5776	663.6351	984.2405	1264.4836	1495.8584 (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	613.0446	486.7824	424.9962	273.5088	156.3995	0.0000	0.0000	0.0000	0.0000	258.2752	442.9679	625.9202 (98)
Space heating												3281.8948 (98)
Space heating per m2											(98) / (4) =	34.2328 (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													3638.4643 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	613.0446	486.7824	424.9962	273.5088	156.3995	0.0000	0.0000	0.0000	0.0000	258.2752	442.9679	625.9202	(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)	679.6504	539.6701	471.1709	303.2248	173.3919	0.0000	0.0000	0.0000	0.0000	286.3361	491.0953	693.9249	(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	108.0926	94.2819	97.8383	87.6082	85.2529	74.9266	71.8353	80.8491	81.3057	92.5400	98.3847	104.7822	(64)
Efficiency of water heater	87.8222	87.6317	87.2508	86.4133	84.7964	76.4000	76.4000	76.4000	76.4000	86.0977	87.3331	76.4000	(216)
Fuel for water heating, kWh/month	123.0812	107.5888	112.1345	101.3828	100.5384	98.0714	94.0252	105.8234	106.4211	107.4825	112.6546	119.1755	(219)
Water heating fuel used												1288.3795	(219)
Annual totals kWh/year													
Space heating fuel - main system												3638.4643	(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)												392.7777	(232)
Total delivered energy for all uses												5394.6214	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	3638.4643	3.4800	126.6186 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1288.3795	3.4800	44.8356 (247)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	392.7777	13.1900	51.8074 (250)
Additional standing charges			120.0000 (251)
Total energy cost			353.1540 (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] =	1.0529 (257)
SAP value		85.3118
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	3638.4643	0.2160	785.9083 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1288.3795	0.2160	278.2900 (264)
Space and water heating			1064.1983 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	392.7777	0.5190	203.8516 (268)
Total kg/year			1306.9749 (272)
CO2 emissions per m2			13.6300 (273)
EI value			87.5676
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	$3.48 / 0.8341 = 4.172$, stars = 5
Water heating environmental impact	$0.216 / 0.8341 = 0.2590$, 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	48.5500 (1b)	x 2.3600 (2b)	= 114.5780 (1b) - (3b)
First floor	47.3200 (1c)	x 2.6300 (2c)	= 124.4516 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	95.8700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 239.0296 (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					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) = 0.1673 (8)
Pressure test					Yes
Measured/design AP50					3.9300
Infiltration rate					0.3638 (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) =		0.3366 (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												
Effective ac	0.4123	0.3970	0.3786	0.3534	0.3534	0.3450	0.3450	0.3366	0.3366	0.3618	0.3618	0.3702 (22b)
	0.5850	0.5749	0.5717	0.5624	0.5624	0.5595	0.5595	0.5566	0.5566	0.5654	0.5654	0.5685 (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			2.0400	1.2000	2.4480		(26)
Windows (Uw = 1.40)			21.4000	1.3258	28.3580		(27)
Flr - Ground			48.5530	0.1800	8.7395	75.6000	3670.6068 (28a)
Wl - Brick (Timber Frame)	61.8070	17.9090	43.8980	0.2100	9.2186	7.4000	324.8452 (29a)
Wl - Clad (Timber Frame)	38.8060	5.5240	33.2820	0.2100	6.9892	7.4000	246.2868 (29a)
Rf - Ins Joist	47.3200		47.3200	0.0800	3.7856	7.4000	350.1680 (30)
Rf - Flat over Bay	1.2330		1.2330	0.1700	0.2096	7.4000	9.1242 (30)
Total net area of external elements Aum(A, m ²)			197.7160				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	59.7485		(33)
Party Wall			43.9660	0.0000	0.0000	7.4000	325.3484 (32)
Stud			76.2760			7.4000	564.4425 (32c)
Internal Floor			47.3200			7.4000	350.1680 (32d)
Internal Ceiling			47.3200			7.4000	350.1680 (32e)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 6191.1579 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							64.5787 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							20.9223 (36)
Total fabric heat loss							(33) + (36) = 80.6708 (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	46.1437	45.3479	45.0938	44.3651	44.3651	44.1334	44.1334	43.9072	43.9072	44.6024	44.6024	44.8454 (38)
Heat transfer coeff	126.8145	126.0187	125.7647	125.0359	125.0359	124.8042	124.8042	124.5780	124.5780	125.2732	125.2732	125.5162 (39)
Average = Sum(39)m / 12 =												125.2914 (39)
HLP	1.3228	1.3145	1.3118	1.3042	1.3042	1.3018	1.3018	1.2994	1.2994	1.3067	1.3067	1.3092 (40)
HLP (average)												1.3069 (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												2.6979 (42)
Average daily hot water use (litres/day)												98.2742 (43)
Daily hot water use	108.1017	104.1707	100.2397	96.3088	92.3778	88.4468	88.4468	92.3778	96.3088	100.2397	104.1707	108.1017 (44)
Energy conte	160.3117	140.2096	144.6837	126.1388	121.0332	104.4424	96.7813	111.0579	112.3843	130.9731	142.9673	155.2533 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

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

Energy content (annual)												Total = Sum (45)m =	1546.2366 (45)
Distribution loss (46)m = 0.15 x (45)m													
	24.0467	21.0314	21.7026	18.9208	18.1550	15.6664	14.5172	16.6587	16.8576	19.6460	21.4451	23.2880 (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	0.6707	0.6087	0.6508	0.5467	0.5031	0.4157	0.3852	0.4617	0.4871	0.5892	0.6206	0.6496 (61)	
Total heat required for water heating calculated for each month	160.9824	140.8183	145.3346	126.6855	121.5363	104.8581	97.1665	111.5196	112.8714	131.5622	143.5880	155.9028 (62)	
WWHRS	-52.8897	-46.5364	-47.4963	-39.0773	-36.2834	-29.9315	-25.3312	-30.6705	-31.5656	-39.0222	-45.2032	-51.1206 eq. (G10)	
Total of WWHRS savings												-475.1281	
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	108.0926	94.2819	97.8383	87.6082	85.2529	74.9266	71.8353	80.8491	81.3057	92.5400	98.3847	104.7822 (64)	
Heat gains from water heating, kWh/month	53.4713	46.7719	48.2701	42.0778	40.3693	34.8310	32.2761	37.0422	37.4895	43.6958	47.6918	51.7841 (65)	

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													2949.9838 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	522.2311	422.0056	354.4107	213.0602	104.6785	0.0000	0.0000	0.0000	0.0000	174.0177	344.6243	525.8573	(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)	578.9702	467.8554	392.9166	236.2087	116.0515	0.0000	0.0000	0.0000	0.0000	192.9243	382.0668	582.9904	(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	108.0926	94.2819	97.8383	87.6082	85.2529	74.9266	71.8353	80.8491	81.3057	92.5400	98.3847	104.7822	(64)
Efficiency of water heater (217)m	87.4900	87.3197	86.8078	85.6900	83.4353	76.4000	76.4000	76.4000	76.4000	84.8775	86.7212	76.4000	(216)
Fuel for water heating, kWh/month	123.5486	107.9732	112.7067	102.2385	102.1785	98.0714	94.0252	105.8234	106.4211	109.0277	113.4494	119.6529	(219)
Water heating fuel used													1295.1168 (219)
Annual totals kWh/year													
Space heating fuel - main system													2949.9838 (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)													392.7777 (232)
Total delivered energy for all uses													4712.8782 (238)

10a. Fuel costs - using BEDF prices (572)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2949.9838	5.7300	169.0341 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1295.1168	5.7300	74.2102 (247)
Pumps and fans for heating	75.0000	24.1800	18.1350 (249)
Energy for lighting	392.7777	24.1800	94.9736 (250)
Additional standing charges			114.0000 (251)
Total energy cost			470.3529 (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	2949.9838	0.2160	637.1965 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1295.1168	0.2160	279.7452 (264)
Space and water heating			916.9417 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	392.7777	0.5190	203.8516 (268)
Total kg/year			1159.7183 (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	2949.9838	1.2200	3598.9803 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1295.1168	1.2200	1580.0425 (264)
Space and water heating			5179.0227 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	392.7777	3.0700	1205.8274 (268)
Primary energy kWh/year			6615.1001 (272)
Primary energy kWh/m2/year			69.0007 (273)

SAP 2012 EPC IMPROVEMENTS

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

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

Current energy efficiency rating: B 85
Current environmental impact rating: B 88

(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	+ 9.5	-£ 471	-1010 kg (87.1%)

Measures omitted - SAP change or cost saving too small:			
N Solar water heating	+ 0.9	-£ 34	-148 kg (12.8%)

	Typical annual savings	Energy efficiency	Environmental impact
Recommended measures			
Solar photovoltaic panels	£471	10.54 kg/m²	A 95
Total Savings	£471	10.54 kg/m²	A 96
Potential energy efficiency rating:			A 95
Potential environmental impact rating:			A 96

Fuel prices for cost data on this page from database revision number 572 TEST (30 May 2025)
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	£113	£113	£0
Mains gas	£357	£357	£0
Space heating	£301	£301	£0
Water heating	£74	£74	£0
Lighting	£95	£95	£0
Generated (PV)	-£0	-£471	£471
Total cost of fuels	£470	-£1	£471
Total cost of uses	£470	-£1	£471
Delivered energy	49 kWh/m²	29 kWh/m²	20 kWh/m²
Carbon dioxide emissions	1.2 tonnes	0.1 tonnes	1.0 tonnes
CO2 emissions per m²	12 kg/m²	2 kg/m²	11 kg/m²
Primary energy	69 kWh/m²	7 kWh/m²	62 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	48.5500 (1b)	x 2.3600 (2b)	= 114.5780 (1b) - (3b)
First floor	47.3200 (1c)	x 2.6300 (2c)	= 124.4516 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	95.8700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 239.0296 (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					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) = 0.1673 (8)
Pressure test					Yes
Measured/design AP50					3.9300
Infiltration rate					0.3638 (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) =	0.3366 (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	0.4291	0.4207	0.4123	0.3702	0.3618	0.3197	0.3197	0.3113	0.3366	0.3618	0.3786	0.3955 (22b)
Effective ac	0.5921	0.5885	0.5850	0.5685	0.5654	0.5511	0.5511	0.5485	0.5566	0.5654	0.5717	0.5782 (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			2.0400	1.2000	2.4480		(26)
Windows (Uw = 1.40)			21.4000	1.3258	28.3580		(27)
Flr - Ground			48.5530	0.1800	8.7395	75.6000	3670.6068 (28a)
Wl - Brick (Timber Frame)	61.8070	17.9090	43.8980	0.2100	9.2186	7.4000	324.8452 (29a)
Wl - Clad (Timber Frame)	38.8060	5.5240	33.2820	0.2100	6.9892	7.4000	246.2868 (29a)
Rf - Ins Joist	47.3200		47.3200	0.0800	3.7856	7.4000	350.1680 (30)
Rf - Flat over Bay	1.2330		1.2330	0.1700	0.2096	7.4000	9.1242 (30)
Total net area of external elements Aum(A, m ²)			197.7160				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	59.7485		(33)
Party Wall			43.9660	0.0000	0.0000	7.4000	325.3484 (32)
Stud			76.2760			7.4000	564.4425 (32c)
Internal Floor			47.3200			7.4000	350.1680 (32d)
Internal Ceiling			47.3200			7.4000	350.1680 (32e)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 6191.1579 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							64.5787 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							20.9223 (36)
Total fabric heat loss							(33) + (36) = 80.6708 (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	46.7021	46.4201	46.1437	44.8454	44.6024	43.4716	43.4716	43.2622	43.9072	44.6024	45.0938	45.6076 (38)
Heat transfer coeff	127.3729	127.0909	126.8145	125.5162	125.2732	124.1425	124.1425	123.9330	124.5780	125.2732	125.7647	126.2784 (39)
Average = Sum(39)m / 12 =												125.5150 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.3286	1.3257	1.3228	1.3092	1.3067	1.2949	1.2949	1.2927	1.2994	1.3067	1.3118	1.3172 (40)
HLP (average)												1.3092 (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												2.6979 (42)
Average daily hot water use (litres/day)												98.2742 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	108.1017	104.1707	100.2397	96.3088	92.3778	88.4468	88.4468	92.3778	96.3088	100.2397	104.1707	108.1017 (44)
Energy conte	160.3117	140.2096	144.6837	126.1388	121.0332	104.4424	96.7813	111.0579	112.3843	130.9731	142.9673	155.2533 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

Energy content (annual)	Total = Sum (45)m = 1546.2366 (45)										
Distribution loss (46)m = 0.15 x (45)m											
24.0467	21.0314	21.7026	18.9208	18.1550	15.6664	14.5172	16.6587	16.8576	19.6460	21.4451	23.2880 (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	0.6707	0.6087	0.6508	0.5467	0.5031	0.4157	0.3852	0.4617	0.4871	0.5892	0.6206 (61)
Total heat required for water heating calculated for each month											
160.9824	140.8183	145.3346	126.6855	121.5363	104.8581	97.1665	111.5196	112.8714	131.5622	143.5880	155.9028 (62)
WWHRS	-52.8897	-46.5364	-47.4963	-39.0773	-36.2834	-29.9315	-25.3312	-30.6705	-31.5656	-39.0222	-45.2032 eq. (G10)
Total of WWHRS savings											
Solar input	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											
108.0926	94.2819	97.8383	87.6082	85.2529	74.9266	71.8353	80.8491	81.3057	92.5400	98.3847	104.7822 (64)
Heat gains from water heating, kWh/month											
53.4713	46.7719	48.2701	42.0778	40.3693	34.8310	32.2761	37.0422	37.4895	43.6958	47.6918	51.7841 (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	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	55.6017	49.3850	40.1626	30.4056	22.7286	19.1884	20.7338	26.9505	36.1729	45.9299	53.6069	57.1471	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	372.3477	376.2115	366.4749	345.7467	319.5810	294.9890	278.5601	274.6962	284.4329	305.1611	331.3267	355.9187	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	(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)	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	(71)
Water heating gains (Table 5)	71.8700	69.6010	64.8791	58.4414	54.2598	48.3764	43.3818	49.7879	52.0688	58.7310	66.2386	69.6023	(72)
Total internal gains	610.6618	606.0398	582.3588	545.4360	507.4117	473.3962	453.5179	462.2770	483.5170	520.6642	562.0146	593.5104	(73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c			Access factor Table 6d			Gains W
Northeast					0.8120	11.2829	0.7300	0.7200			0.7700			3.3371 (75)
Southeast					6.0470	36.7938	0.7300	0.7200			0.7700			81.0408 (77)
Southwest					8.3730	36.7938	0.7300	0.7200			0.7700			112.2134 (79)
Northwest					6.1640	11.2829	0.7300	0.7200			0.7700			25.3322 (81)

Solar gains	221.9235	387.5406	555.5442	730.7432	857.1913	868.0145	829.7748	732.8365	615.8074	435.1349	267.5474	188.7981 (83)		
Total gains	832.5853	993.5804	1137.9030	1276.1792	1364.6030	1341.4107	1283.2928	1195.1135	1099.3243	955.7991	829.5620	782.3085 (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	13.5018	13.5318	13.5613	13.7016	13.7281	13.8532	13.8532	13.8766	13.8047	13.7281	13.6745	13.6188
alpha	1.9001	1.9021	1.9041	1.9134	1.9152	1.9235	1.9235	1.9251	1.9203	1.9152	1.9116	1.9079
util living area	0.8904	0.8516	0.7967	0.7121	0.6040	0.4798	0.3741	0.4092	0.5745	0.7525	0.8573	0.9004 (86)
MIT	17.9695	18.3723	18.9561	19.6547	20.2474	20.6650	20.8532	20.8200	20.4948	19.7114	18.7156	17.8855 (87)
Th 2	19.8185	19.8208	19.8230	19.8336	19.8356	19.8448	19.8448	19.8465	19.8413	19.8356	19.8316	19.8274 (88)
util rest of house	0.8781	0.8356	0.7747	0.6803	0.5582	0.4146	0.2899	0.3241	0.5113	0.7175	0.8392	0.8892 (89)
MIT 2	15.8971	16.4595	17.2717	18.2313	19.0163	19.5411	19.7463	19.7189	19.3523	18.3362	16.9587	15.7819 (90)
Living area fraction	16.3048	16.8358	17.6031	18.5113	19.2585	19.7622	19.9640	19.9355	19.5771	18.6067	17.3044	16.1957 (91)
MIT	15.8971	16.4595	17.2717	18.2313	19.0163	19.5411	19.7463	19.7189	19.3523	18.3362	16.9587	15.7819 (90)
Temperature adjustment	16.1548	16.6858	17.4531	18.3613	19.1085	19.6122	19.8140	19.7855	19.4271	18.4567	17.1544	16.0457 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Utilisation	0.8239	0.7785	0.7187	0.6329	0.5261	0.4004	0.2875	0.3192	0.4859	0.6666	0.7826	0.8367	(94)	
Useful gains	685.9905	773.4884	817.7805	807.6781	717.8674	537.0931	368.9482	381.4996	534.2120	637.0964	649.2503	654.5677	(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	1509.9752	1497.8669	1389.0119	1187.5514	928.0817	622.2246	398.9974	419.5776	663.6351	984.2405	1264.4836	1495.8584	(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	613.0446	486.7824	424.9962	273.5088	156.3995	0.0000	0.0000	0.0000	0.0000	258.2752	442.9679	625.9202	(98)	
Space heating												3281.8948	(98)	
Space heating per m2												(98) / (4) =	34.2328	(99)

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													3638.4643 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	613.0446	486.7824	424.9962	273.5088	156.3995	0.0000	0.0000	0.0000	0.0000	258.2752	442.9679	625.9202	(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)	679.6504	539.6701	471.1709	303.2248	173.3919	0.0000	0.0000	0.0000	0.0000	286.3361	491.0953	693.9249	(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	108.0926	94.2819	97.8383	87.6082	85.2529	74.9266	71.8353	80.8491	81.3057	92.5400	98.3847	104.7822	(64)
Efficiency of water heater (217)m	87.8222	87.6317	87.2508	86.4133	84.7964	76.4000	76.4000	76.4000	76.4000	86.0977	87.3331	76.4000	(216)
Fuel for water heating, kWh/month	123.0812	107.5888	112.1345	101.3828	100.5384	98.0714	94.0252	105.8234	106.4211	107.4825	112.6546	119.1755	(219)
Water heating fuel used												1288.3795	(219)
Annual totals kWh/year													
Space heating fuel - main system												3638.4643	(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)												392.7777	(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												3667.3820	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	3638.4643	3.4800	126.6186 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1288.3795	3.4800	44.8356 (247)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	392.7777	13.1900	51.8074 (250)
Additional standing charges			120.0000 (251)
Energy saving/generation technologies			
PV Unit	-1727.2394	13.1900	-227.8229 (252)
Total energy cost			125.3312 (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] =	0.3737 (257)
SAP value		94.7873
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	3638.4643	0.2160	785.9083 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1288.3795	0.2160	278.2900 (264)
Space and water heating			1064.1983 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	392.7777	0.5190	203.8516 (268)
Energy saving/generation technologies			
PV Unit	-1727.2394	0.5190	-896.4372 (269)
Total kg/year			410.5376 (272)
CO2 emissions per m2			4.2800 (273)
EI value			96.0948
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	48.5500 (1b)	x 2.3600 (2b)	= 114.5780 (1b) - (3b)
First floor	47.3200 (1c)	x 2.6300 (2c)	= 124.4516 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	95.8700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 239.0296 (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					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) = 0.1673 (8)
Pressure test					Yes
Measured/design AP50					3.9300
Infiltration rate					0.3638 (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) =		0.3366 (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												
Effective ac	0.4123	0.3970	0.3786	0.3534	0.3534	0.3450	0.3450	0.3366	0.3366	0.3618	0.3618	0.3702 (22b)
	0.5850	0.5749	0.5717	0.5624	0.5624	0.5595	0.5595	0.5566	0.5566	0.5654	0.5654	0.5685 (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			2.0400	1.2000	2.4480		(26)
Windows (Uw = 1.40)			21.4000	1.3258	28.3580		(27)
Flr - Ground			48.5530	0.1800	8.7395	75.6000	3670.6068 (28a)
Wl - Brick (Timber Frame)	61.8070	17.9090	43.8980	0.2100	9.2186	7.4000	324.8452 (29a)
Wl - Clad (Timber Frame)	38.8060	5.5240	33.2820	0.2100	6.9892	7.4000	246.2868 (29a)
Rf - Ins Joist	47.3200		47.3200	0.0800	3.7856	7.4000	350.1680 (30)
Rf - Flat over Bay	1.2330		1.2330	0.1700	0.2096	7.4000	9.1242 (30)
Total net area of external elements Aum(A, m ²)			197.7160				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	59.7485		(33)
Party Wall			43.9660	0.0000	0.0000	7.4000	325.3484 (32)
Stud			76.2760			7.4000	564.4425 (32c)
Internal Floor			47.3200			7.4000	350.1680 (32d)
Internal Ceiling			47.3200			7.4000	350.1680 (32e)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 6191.1579 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							64.5787 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							20.9223 (36)
Total fabric heat loss							(33) + (36) = 80.6708 (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	46.1437	45.3479	45.0938	44.3651	44.3651	44.1334	44.1334	43.9072	43.9072	44.6024	44.6024	44.8454 (38)
Heat transfer coeff	126.8145	126.0187	125.7647	125.0359	125.0359	124.8042	124.8042	124.5780	124.5780	125.2732	125.2732	125.5162 (39)
Average = Sum(39)m / 12 =												125.2914 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.3228	1.3145	1.3118	1.3042	1.3042	1.3018	1.3018	1.2994	1.2994	1.3067	1.3067	1.3092 (40)
HLP (average)												1.3069 (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												2.6979 (42)
Average daily hot water use (litres/day)												98.2742 (43)
Daily hot water use	108.1017	104.1707	100.2397	96.3088	92.3778	88.4468	88.4468	92.3778	96.3088	100.2397	104.1707	108.1017 (44)
Energy conte	160.3117	140.2096	144.6837	126.1388	121.0332	104.4424	96.7813	111.0579	112.3843	130.9731	142.9673	155.2533 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

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

Energy content (annual)	Total = Sum (45)m = 1546.2366 (45)										
Distribution loss (46)m = 0.15 x (45)m											
24.0467	21.0314	21.7026	18.9208	18.1550	15.6664	14.5172	16.6587	16.8576	19.6460	21.4451	23.2880 (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	0.6707	0.6087	0.6508	0.5467	0.5031	0.4157	0.3852	0.4617	0.4871	0.5892	0.6206 (61)
Total heat required for water heating calculated for each month											
160.9824	140.8183	145.3346	126.6855	121.5363	104.8581	97.1665	111.5196	112.8714	131.5622	143.5880	155.9028 (62)
WWHRS	-52.8897	-46.5364	-47.4963	-39.0773	-36.2834	-29.9315	-25.3312	-30.6705	-31.5656	-39.0222	-45.2032 eq. (G10)
Total of WWHRS savings											
Solar input	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											
108.0926	94.2819	97.8383	87.6082	85.2529	74.9266	71.8353	80.8491	81.3057	92.5400	98.3847	104.7822 (64)
Heat gains from water heating, kWh/month											
53.4713	46.7719	48.2701	42.0778	40.3693	34.8310	32.2761	37.0422	37.4895	43.6958	47.6918	51.7841 (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	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718	161.8718 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	55.6017	49.3850	40.1626	30.4056	22.7286	19.1884	20.7338	26.9505	36.1729	45.9299	53.6069	57.1471 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	372.3477	376.2115	366.4749	345.7467	319.5810	294.9890	278.5601	274.6962	284.4329	305.1611	331.3267	355.9187 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850	53.8850 (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)	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145	-107.9145 (71)
Water heating gains (Table 5)	71.8700	69.6010	64.8791	58.4414	54.2598	48.3764	43.3818	49.7879	52.0688	58.7310	66.2386	69.6023 (72)
Total internal gains	610.6618	606.0398	582.3588	545.4360	507.4117	473.3962	453.5179	462.2770	483.5170	520.6642	562.0146	593.5104 (73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c			Access factor Table 6d			Gains W
Northeast					0.8120	14.6130	0.7300	0.7200			0.7700			4.3220 (75)
Southeast					6.0470	45.0642	0.7300	0.7200			0.7700			99.2567 (77)
Southwest					8.3730	45.0642	0.7300	0.7200			0.7700			137.4362 (79)
Northwest					6.1640	14.6130	0.7300	0.7200			0.7700			32.8089 (81)

Solar gains	273.8239	407.8284	597.9812	799.4842	890.0968	997.7342	920.8612	842.8381	700.7943	501.1211	329.2010			228.9105 (83)
Total gains	884.4856	1013.8681	1180.3401	1344.9202	1397.5085	1471.1304	1374.3791	1305.1150	1184.3113	1021.7853	891.2156			822.4210 (84)

7. Mean internal temperature (heating season)

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

Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	13.5613	13.6469	13.6745	13.7542	13.7542	13.7797	13.7797	13.8047	13.8047	13.7281	13.7281	13.7016
alpha	1.9041	1.9098	1.9116	1.9169	1.9169	1.9186	1.9186	1.9203	1.9203	1.9152	1.9152	1.9134
util living area	0.8642	0.8299	0.7629	0.6615	0.5394	0.3788	0.2782	0.2830	0.4717	0.6779	0.8127	0.8756 (86)
MIT	18.4219	18.7197	19.2989	19.9540	20.4829	20.8247	20.9348	20.9351	20.7196	20.1230	19.2247	18.3903 (87)
Th 2	19.8230	19.8295	19.8316	19.8375	19.8375	19.8394	19.8394	19.8413	19.8413	19.8356	19.8356	19.8336 (88)
util rest of house	0.8484	0.8109	0.7367	0.6240	0.4852	0.3059	0.1875	0.1880	0.3954	0.6307	0.7877	0.8607 (89)
MIT 2	16.5374	16.9508	17.7487	18.6323	19.3138	19.7065	19.8096	19.8127	19.6094	18.8822	17.6701	16.4849 (90)
Living area fraction	16.9081	17.2988	18.0536	18.8923	19.5438	19.9265	20.0309	20.0335	19.8278	19.1263	17.9759	0.1967 (91)
MIT	16.9081	17.2988	18.0536	18.8923	19.5438	19.9265	20.0309	20.0335	19.8278	19.1263	17.9759	16.8578 (92)
Temperature adjustment	16.7581	17.1488	17.9036	18.7423	19.3938	19.7765	19.8809	19.8835	19.6778	18.9763	17.8259	-0.1500
adjusted MIT	16.7581	17.1488	17.9036	18.7423	19.3938	19.7765	19.8809	19.8835	19.6778	18.9763	17.8259	16.7078 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.7919	0.7539	0.6836	0.5834	0.4624	0.3017	0.1909	0.1916	0.3836	0.5896	0.7317	0.8053 (94)
Useful gains	700.4030	764.3651	806.8978	784.6825	646.2573	443.7999	262.3362	250.1236	454.3134	602.4652	652.0628	662.3078 (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	1402.3265	1392.3495	1283.2563	1080.5994	786.9542	483.7981	272.1907	259.5625	520.4678	836.3599	1130.7076	1369.1052 (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	522.2311	422.0056	354.4107	213.0602	104.6785	0.0000	0.0000	0.0000	0.0000	174.0177	344.6243	525.8573 (98)
Space heating												2660.8854 (98)
Space heating per m2												27.7551 (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													2949.9838 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	522.2311	422.0056	354.4107	213.0602	104.6785	0.0000	0.0000	0.0000	0.0000	174.0177	344.6243	525.8573	(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)	578.9702	467.8554	392.9166	236.2087	116.0515	0.0000	0.0000	0.0000	0.0000	192.9243	382.0668	582.9904	(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	108.0926	94.2819	97.8383	87.6082	85.2529	74.9266	71.8353	80.8491	81.3057	92.5400	98.3847	104.7822	(64)
Efficiency of water heater (217)m	87.4900	87.3197	86.8078	85.6900	83.4353	76.4000	76.4000	76.4000	76.4000	84.8775	86.7212	76.4000	(216)
Fuel for water heating, kWh/month	123.5486	107.9732	112.7067	102.2385	102.1785	98.0714	94.0252	105.8234	106.4211	109.0277	113.4494	119.6529	(219)
Water heating fuel used												1295.1168	(219)
Annual totals kWh/year													
Space heating fuel - main system												2949.9838	(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)												392.7777	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV Unit 0 (0.80 * 2.50 * 1217 * 0.80) =												-1946.4459	(233)
Total delivered energy for all uses												2766.4323	(238)

10a. Fuel costs - using BEDF prices (572)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2949.9838	5.7300	169.0341 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1295.1168	5.7300	74.2102 (247)
Pumps and fans for heating	75.0000	24.1800	18.1350 (249)
Energy for lighting	392.7777	24.1800	94.9736 (250)
Additional standing charges			114.0000 (251)
Energy saving/generation technologies			
PV Unit	-1946.4459	24.1800	-470.6506 (252)
Total energy cost			-0.2977 (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	2949.9838	0.2160	637.1965 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1295.1168	0.2160	279.7452 (264)
Space and water heating			916.9417 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	392.7777	0.5190	203.8516 (268)
Energy saving/generation technologies			
PV Unit	-1946.4459	0.5190	-1010.2054 (269)
Total kg/year			149.5129 (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	2949.9838	1.2200	3598.9803 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1295.1168	1.2200	1580.0425 (264)
Space and water heating			5179.0227 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	392.7777	3.0700	1205.8274 (268)
Energy saving/generation technologies			
PV Unit	-1946.4459	3.0700	-5975.5890 (269)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)



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

Primary energy kWh/year	639.5111 (272)
Primary energy kWh/m2/year	6.6706 (273)

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Built)

Property Reference	083 - PRJ013014	Issued on Date	03/06/2025
Assessment Reference	083	Prop Type Ref	D-SP
Property	1 Erwood Close, Netley Abbey, Southampton, SO31 5TJ		
SAP Rating	85 B	DER	14.45
Environmental	88 B	TER	17.10
CO ₂ Emissions (t/year)	1.16	% DER<TER	15.49
General Requirements Compliance	Pass	DFEE	47.02
		TFEE	51.14
		% DFEE<TFEE	8.07
Assessor Details	Mr. Christopher Nicholls, Briary Energy Limited, Tel: 0203 397 1373, chris@briaryenergy.co.uk		Assessor ID
			4299-0004
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)	17.10	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	14.45	kgCO ₂ /m ²	Pass
	-2.65 (-15.5%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	51.14	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	47.02	kWh/m ² /yr	
	-4.1 (-8.0%)	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)	0.17 (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	3.93 (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 East

0.81 m², No overhang

Windows facing South East

6.05 m², No overhang

Windows facing South West

8.37 m², No overhang

Windows facing North West

6.16 m², No overhang

Air change rate

4.68 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

3.93 (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

Air permeability

3.9

m³/m²h

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Built)

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