

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

Property Reference	038 - PRJ013014	Issued on Date	02/05/2024
Assessment Reference	038	Prop Type Ref	C
Property	31 Deeble Way, Netley Abbey, Southampton, SO31 5JP		

SAP Rating	85 B	DER	14.37	TER	17.40
Environmental	88 B	% DER<TER	17.40		
CO ₂ Emissions (t/year)	1.15	DFEE	44.32	TTEE	50.23
General Requirements Compliance	Pass	% DFEE<TTEE	11.77		

Assessor Details	Mr. Christopher Nicholls, Briary Energy Limited, Tel: 0203 397 1373, chris@briaryenergy.co.uk	Assessor ID	U903-0001
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Client	
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Calculation of Heat Demand 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	47.7200 (1b)	x 2.3700 (2b)	= 113.0964 (1b) - (3b)
First floor	47.7200 (1c)	x 2.6200 (2c)	= 125.0264 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	95.4400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 238.1228 (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) =	0.1680 (8)					
Pressure test						Yes	4.4600					
Measured/design AP50							0.3910 (18)					
Infiltration rate							1 (19)					
Number of sides sheltered												
Shelter factor						(20) = 1 - [0.075 x (19)] =	0.9250 (20)					
Infiltration rate adjusted to include shelter factor						(21) = (18) x (20) =	0.3617 (21)					
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.9000	4.6000	4.5000	4.2000	4.2000	4.1000	4.1000	4.0000	4.0000	4.3000	4.3000	4.4000 (22)
Wind factor	1.2250	1.1500	1.1250	1.0500	1.0500	1.0250	1.0250	1.0000	1.0000	1.0750	1.0750	1.1000 (22a)
Adj infilt rate	0.4430	0.4159	0.4069	0.3797	0.3797	0.3707	0.3707	0.3617	0.3617	0.3888	0.3888	0.3978 (22b)
Effective ac	0.5981	0.5865	0.5828	0.5721	0.5721	0.5687	0.5687	0.5654	0.5654	0.5756	0.5756	0.5791 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Solid Door			2.0900	1.2000	2.5080		(26)
Windows (Uw = 1.40)			11.5800	1.3258	15.3390		(27)
Fir - Ground			47.7150	0.1800	8.5887	75.6000	3607.2540 (28a)
Wl - Brick (Timber Frame)	97.6560	13.6650	83.9910	0.2100	17.6381	7.4000	621.5334 (29a)
Rf - Ins Joist	47.7150		47.7150	0.0800	3.8172	7.4000	353.0910 (30)
Total net area of external elements Aum(A, m ²)			193.0810				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	47.8910		(33)
Party Wall			46.7690	0.0000	0.0000	7.4000	346.0906 (32)
Stud			74.4133			7.4000	550.6581 (32c)
Internal Floor			47.7150			7.4000	353.0910 (32d)
Internal Ceiling			47.7150			7.4000	353.0910 (32e)
Heat capacity Cm = Sum (A x k)							(28)...(30) + (32) + (32a)...(32e) = 6184.8091 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							64.8031 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							16.8602 (36)
Total fabric heat loss							(33) + (36) = 64.7512 (37)

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

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(38)m	Jan 47.0020	Feb 46.0866	Mar 45.7943	Apr 44.9560	May 44.9560	Jun 44.6894	Jul 44.6894	Aug 44.4293	Sep 44.4293	Oct 45.2290	Nov 45.2290	Dec 45.5085	(38)
Heat transfer coeff	111.7532	110.8378	110.5455	109.7072	109.7072	109.4407	109.4407	109.1805	109.1805	109.9802	109.9802	110.2597	(39)
Average = Sum(39)m / 12 =												110.0011	(39)
HLP	Jan 1.1709	Feb 1.1613	Mar 1.1583	Apr 1.1495	May 1.1495	Jun 1.1467	Jul 1.1467	Aug 1.1440	Sep 1.1440	Oct 1.1523	Nov 1.1523	Dec 1.1553	(40)
HLP (average)												1.1526	(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												2.6931	(42)
Average daily hot water use (litres/day)												98.1614	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	107.9776	104.0511	100.1247	96.1982	92.2718	88.3453	88.3453	92.2718	96.1982	100.1247	104.0511	107.9776	(44)
Energy content (annual)	160.1276	140.0487	144.5177	125.9940	120.8942	104.3225	96.6702	110.9304	112.2553	130.8227	142.8032	155.0751	(45)
Distribution loss (46)m = 0.15 x (45)m	24.0191	21.0073	21.6777	18.8991	18.1341	15.6484	14.5005	16.6396	16.8383	19.6234	21.4205	23.2613	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Combi loss	0.6708	0.6086	0.6503	0.5454	0.5020	0.4147	0.3843	0.4606	0.4859	0.5887	0.6206	0.6496	(61)
Total heat required for water heating calculated for each month	160.7984	140.6573	145.1680	126.5394	121.3962	104.7373	97.0545	111.3910	112.7412	131.4114	143.4239	155.7247	(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	160.7984	140.6573	145.1680	126.5394	121.3962	104.7373	97.0545	111.3910	112.7412	131.4114	143.4239	155.7247	(64)
RHI water heating demand	Total per year (kWh/year) = Sum(64)m =											1551.0434	(64)
Heat gains from water heating, kWh/month	53.4101	46.7183	48.2147	42.0294	40.3228	34.7909	32.2389	36.9995	37.4464	43.6457	47.6372	51.7249	(65)

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

Metabolic gains (Table 5), Watts	Jan 161.5868	Feb 161.5868	Mar 161.5868	Apr 161.5868	May 161.5868	Jun 161.5868	Jul 161.5868	Aug 161.5868	Sep 161.5868	Oct 161.5868	Nov 161.5868	Dec 161.5868	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	61.0062	54.1851	44.0663	33.3610	24.9378	21.0535	22.7491	29.5701	39.6889	50.3942	58.8175	62.7017	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	371.2510	375.1034	365.3954	344.7283	318.6397	294.1202	277.7396	273.8872	283.5951	304.2623	330.3508	354.8704	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	(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)	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	(71)
Water heating gains (Table 5)	71.7878	69.5213	64.8047	58.3741	54.1974	48.3207	43.3319	49.7305	52.0089	58.6636	66.1628	69.5227	(72)
Total internal gains	614.7590	609.5239	584.9805	547.1775	508.4889	474.2085	454.5346	463.9018	486.0070	524.0342	566.0452	597.8088	(73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
North				0.7190	13.4684		0.7300		0.7200		0.7700		3.5272 (74)
East				7.2440	25.1733		0.7300		0.7200		0.7700		66.4212 (76)
West				3.6130	25.1733		0.7300		0.7200		0.7700		33.1281 (80)
Solar gains	103.0764	171.4643	287.0389	422.2167	488.8084	553.1542	508.7104	454.3190	351.8351	222.1981	128.0723		83.3488 (83)
Total gains	717.8355	780.9883	872.0194	969.3942	997.2973	1027.3627	963.2449	918.2208	837.8420	746.2322	694.1175		681.1576 (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	15.3732	15.5001	15.5411	15.6599	15.6599	15.6980	15.6980	15.7354	15.7354	15.6210	15.6210	15.5814	
alpha	2.0249	2.0333	2.0361	2.0440	2.0440	2.0465	2.0465	2.0490	2.0490	2.0414	2.0414	2.0388	
util living area	0.8921	0.8718	0.8234	0.7389	0.6234	0.4590	0.3418	0.3461	0.5558	0.7502	0.8547	0.8987	(86)
MIT	18.4842	18.7069	19.2203	19.8611	20.4181	20.7940	20.9241	20.9249	20.6791	20.0583	19.2246	18.4800	(87)
Th 2	19.9433	19.9511	19.9535	19.9606	19.9606	19.9629	19.9629	19.9651	19.9651	19.9583	19.9583	19.9559	(88)
util rest of house	0.8797	0.8573	0.8029	0.7075	0.5737	0.3848	0.2451	0.2454	0.4826	0.7109	0.8351	0.8870	(89)
MIT 2	16.6650	16.9816	17.7054	18.5946	19.3378	19.7926	19.9228	19.9268	19.6774	18.8840	17.7272	16.6644	(90)

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Living area fraction									fLA = Living area / (4) =				0.1539 (91)
MIT	16.9450	17.2471	17.9386	18.7895	19.5041	19.9467	20.0769	20.0804	19.8316	19.0648	17.9577	16.9439 (92)	
Temperature adjustment												-0.1500	
adjusted MIT	16.7950	17.0971	17.7886	18.6395	19.3541	19.7967	19.9269	19.9304	19.6816	18.9148	17.8077	16.7939 (93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8278	0.8038	0.7488	0.6600	0.5409	0.3720	0.2415	0.2418	0.4601	0.6626	0.7810	0.8363	(94)
Useful gains	594.2366	627.7910	652.9973	639.7536	539.4693	382.1627	232.6137	222.0221	385.5053	494.4782	542.0723	569.6726	(95)
Ext temp.	5.7000	6.1000	7.7000	10.1000	13.1000	15.9000	17.7000	17.8000	15.5000	12.3000	8.8000	5.8000	(96)
Heat loss rate W													
Month fracti	1239.9032	1218.8996	1115.2449	936.8465	686.1190	426.4617	243.7146	232.6024	456.5442	727.4951	990.6703	1212.1806	(97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating	480.3759	397.2249	343.9122	213.9068	109.1074	0.0000	0.0000	0.0000	0.0000	173.3645	322.9906	478.0260	(98)
RHI space heating demand												2518.9084	(98)
												2519	(98)

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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	47.7200 (1b)	x 2.3700 (2b)	= 113.0964 (1b) - (3b)
First floor	47.7200 (1c)	x 2.6200 (2c)	= 125.0264 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	95.4400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 238.1228 (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) = 0.1680 (8)
Pressure test					Yes
Measured/design AP50					4.4600
Infiltration rate					0.3910 (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) =	0.3617 (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	0.4611	0.4521	0.4430	0.3978	0.3888	0.3436	0.3436	0.3345	0.3617	0.3888	0.4069	0.4249 (22b)
Effective ac	0.6063	0.6022	0.5981	0.5791	0.5756	0.5590	0.5590	0.5560	0.5654	0.5756	0.5828	0.5903 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Solid Door			2.0900	1.2000	2.5080		(26)
Windows (Uw = 1.40)			11.5800	1.3258	15.3390		(27)
Flr - Ground			47.7150	0.1800	8.5887	75.6000	3607.2540 (28a)
Wl - Brick (Timber Frame)	97.6560	13.6650	83.9910	0.2100	17.6381	7.4000	621.5334 (29a)
Rf - Ins Joist	47.7150		47.7150	0.0800	3.8172	7.4000	353.0910 (30)
Total net area of external elements Aum(A, m ²)			193.0810				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	47.8910		(33)
Party Wall			46.7690	0.0000	0.0000	7.4000	346.0906 (32)
Stud			74.4133			7.4000	550.6581 (32c)
Internal Floor			47.7150			7.4000	353.0910 (32d)
Internal Ceiling			47.7150			7.4000	353.0910 (32e)

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

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	47.6444	47.3200	47.0020	45.5085	45.2290	43.9282	43.9282	43.6873	44.4293	45.2290	45.7943	46.3853 (38)
Average = Sum(39)m / 12 =	112.3956	112.0712	111.7532	110.2597	109.9802	108.6794	108.6794	108.4385	109.1805	109.9802	110.5455	111.1365 (39)
												110.2583 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1777	1.1743	1.1709	1.1553	1.1523	1.1387	1.1387	1.1362	1.1440	1.1523	1.1583	1.1645 (40)
Days in month												1.1553 (40)
	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.6931 (42)
Average daily hot water use (litres/day)												98.1614 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	107.9776	104.0511	100.1247	96.1982	92.2718	88.3453	88.3453	92.2718	96.1982	100.1247	104.0511	107.9776 (44)
Energy conte	160.1276	140.0487	144.5177	125.9940	120.8942	104.3225	96.6702	110.9304	112.2553	130.8227	142.8032	155.0751 (45)
Energy content (annual)										Total = Sum(45)m =		1544.4617 (45)
Distribution loss (46)m = 0.15 x (45)m												

	24.0191	21.0073	21.6777	18.8991	18.1341	15.6484	14.5005	16.6396	16.8383	19.6234	21.4205	23.2613 (46)	
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)	
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)	
Combi loss	0.6708	0.6086	0.6503	0.5454	0.5020	0.4147	0.3843	0.4606	0.4859	0.5887	0.6206	0.6496 (61)	
Total heat required for water heating calculated for each month	160.7984	140.6573	145.1680	126.5394	121.3962	104.7373	97.0545	111.3910	112.7412	131.4114	143.4239	155.7247 (62)	
WWHRS	-52.8094	-46.4657	-47.4242	-39.0182	-36.2287	-29.8865	-25.2932	-30.6245	-31.5182	-38.9634	-45.1348	-51.0429 eq. (G10)	
Total of WWHRS savings												-474.4098	
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)	
								Solar input (sum of months) = Sum(63)m =					0.0000 (63)
Output from w/h	107.9890	94.1916	97.7438	87.5212	85.1676	74.8508	71.7613	80.7666	81.2231	92.4480	98.2890	104.6817 (64)	
								Total per year (kWh/year) = Sum(64)m =					1076.6336 (64)
Heat gains from water heating, kWh/month	53.4101	46.7183	48.2147	42.0294	40.3228	34.7909	32.2389	36.9995	37.4464	43.6457	47.6372	51.7249 (65)	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8520	0.8257	0.7801	0.7056	0.6057	0.4764	0.3518	0.3858	0.5644	0.7315	0.8215	0.8611 (94)
Useful gains	592.3483	633.1149	658.5931	653.8359	590.6993	454.0379	320.1598	329.4253	444.6702	519.8198	547.3599	571.7510 (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	1342.6468	1314.3858	1209.7858	1029.7578	806.3438	544.1769	352.8323	370.2112	578.4516	856.4896	1114.5746	1331.3791 (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	558.2221	457.8140	410.0874	270.6638	160.4395	0.0000	0.0000	0.0000	0.0000	250.4823	408.3946	565.1633 (98)
Space heating												3081.2670 (98)
Space heating per m2												32.2849 (99)
										(98) / (4) =		

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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												3416.0388	(211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	558.2221	457.8140	410.0874	270.6638	160.4395	0.0000	0.0000	0.0000	0.0000	250.4823	408.3946	565.1633	(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)	618.8716	507.5544	454.6423	300.0707	177.8708	0.0000	0.0000	0.0000	0.0000	277.6966	452.7656	626.5668	(211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating requirement	107.9890	94.1916	97.7438	87.5212	85.1676	74.8508	71.7613	80.7666	81.2231	92.4480	98.2890	104.6817	(64)
Efficiency of water heater	87.6342	87.5030	87.1695	86.3872	84.8833	76.4000	76.4000	76.4000	76.4000	86.0117	87.1465	87.7237	(217)
Fuel for water heating, kWh/month	123.2270	107.6438	112.1308	101.3127	100.3349	97.9723	93.9284	105.7154	106.3129	107.4830	112.7860	119.3311	(219)
Water heating fuel used												1288.1783	(219)
Annual totals kWh/year													
Space heating fuel - main system												3416.0388	(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)												430.9551	(232)
Total delivered energy for all uses												5210.1722	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	3416.0388	3.4800	118.8782 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1288.1783	3.4800	44.8286 (247)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	430.9551	13.1900	56.8430 (250)
Additional standing charges			120.0000 (251)
Total energy cost			350.4422 (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] = 1.0480 (257)
SAP value	85.3799
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	3416.0388	0.2160	737.8644 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1288.1783	0.2160	278.2465 (264)
Space and water heating			1016.1109 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	430.9551	0.5190	223.6657 (268)
Total kg/year			1278.7016 (272)
CO2 emissions per m2			13.4000 (273)
EI value			87.7993
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	$3.48 / 0.8334 = 4.176$, stars = 5
Water heating environmental impact	$0.216 / 0.8334 = 0.2592$, 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	47.7200 (1b)	x 2.3700 (2b)	= 113.0964 (1b) - (3b)
First floor	47.7200 (1c)	x 2.6200 (2c)	= 125.0264 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	95.4400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 238.1228 (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) = 0.1680 (8)
Pressure test					Yes
Measured/design AP50					4.4600
Infiltration rate					0.3910 (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) =	0.3617 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.9000	4.6000	4.5000	4.2000	4.2000	4.1000	4.1000	4.0000	4.0000	4.3000	4.3000	4.4000 (22)
Wind factor	1.2250	1.1500	1.1250	1.0500	1.0500	1.0250	1.0250	1.0000	1.0000	1.0750	1.0750	1.1000 (22a)
Adj infilt rate	0.4430	0.4159	0.4069	0.3797	0.3797	0.3707	0.3707	0.3617	0.3617	0.3888	0.3888	0.3978 (22b)
Effective ac	0.5981	0.5865	0.5828	0.5721	0.5721	0.5687	0.5687	0.5654	0.5654	0.5756	0.5756	0.5791 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Solid Door			2.0900	1.2000	2.5080		(26)
Windows (Uw = 1.40)			11.5800	1.3258	15.3390		(27)
Flr - Ground			47.7150	0.1800	8.5887	75.6000	3607.2540 (28a)
Wl - Brick (Timber Frame)	97.6560	13.6650	83.9910	0.2100	17.6381	7.4000	621.5334 (29a)
Rf - Ins Joist	47.7150		47.7150	0.0800	3.8172	7.4000	353.0910 (30)
Total net area of external elements Aum(A, m ²)			193.0810				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	47.8910		(33)
Party Wall			46.7690	0.0000	0.0000	7.4000	346.0906 (32)
Stud			74.4133			7.4000	550.6581 (32c)
Internal Floor			47.7150			7.4000	353.0910 (32d)
Internal Ceiling			47.7150			7.4000	353.0910 (32e)

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

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	47.0020	46.0866	45.7943	44.9560	44.9560	44.6894	44.6894	44.4293	44.4293	45.2290	45.2290	45.5085 (38)
Heat transfer coeff	111.7532	110.8378	110.5455	109.7072	109.7072	109.4407	109.4407	109.1805	109.1805	109.9802	109.9802	110.2597 (39)
Average = Sum(39)m / 12 =												110.0011 (39)

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1709	1.1613	1.1583	1.1495	1.1495	1.1467	1.1467	1.1440	1.1440	1.1523	1.1523	1.1553 (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												2.6931 (42)
Average daily hot water use (litres/day)												98.1614 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	107.9776	104.0511	100.1247	96.1982	92.2718	88.3453	88.3453	92.2718	96.1982	100.1247	104.0511	107.9776 (44)
Energy conte	160.1276	140.0487	144.5177	125.9940	120.8942	104.3225	96.6702	110.9304	112.2553	130.8227	142.8032	155.0751 (45)
Energy content (annual)										Total = Sum(45)m =		1544.4617 (45)
Distribution loss (46)m = 0.15 x (45)m												

Water storage loss:	24.0191	21.0073	21.6777	18.8991	18.1341	15.6484	14.5005	16.6396	16.8383	19.6234	21.4205	23.2613 (46)
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	0.6708	0.6086	0.6503	0.5454	0.5020	0.4147	0.3843	0.4606	0.4859	0.5887	0.6206	0.6496 (61)
Total heat required for water heating calculated for each month	160.7984	140.6573	145.1680	126.5394	121.3962	104.7373	97.0545	111.3910	112.7412	131.4114	143.4239	155.7247 (62)
WWHRS	-52.8094	-46.4657	-47.4242	-39.0182	-36.2287	-29.8865	-25.2932	-30.6245	-31.5182	-38.9634	-45.1348	-51.0429 eq. (G10)
Total of WWHRS savings	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-474.4098
Solar input								Solar input	(sum of months)	= Sum (63)m		0.0000 (63)
Output from w/h	107.9890	94.1916	97.7438	87.5212	85.1676	74.8508	71.7613	80.7666	81.2231	92.4480	98.2890	104.6817 (64)
Heat gains from water heating, kWh/month	53.4101	46.7183	48.2147	42.0294	40.3228	34.7909	32.2389	36.9995	37.4464	43.6457	47.6372	51.7249 (65)
								Total per year (kWh/year)	= Sum (64)m	=	1076.6336	64

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	161.5868	161.5868	161.5868	161.5868	161.5868	161.5868	161.5868	161.5868	161.5868	161.5868	161.5868	161.5868 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	61.0062	54.1851	44.0663	33.3610	24.9378	21.0535	22.7491	29.5701	39.6889	50.3942	58.8175	62.7017 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	371.2510	375.1034	365.3954	344.7283	318.6397	294.1202	277.7396	273.8872	283.5951	304.2623	330.3508	354.8704 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518 (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)	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245 (71)
Water heating gains (Table 5)	71.7878	69.5213	64.8047	58.3741	54.1974	48.3207	43.3319	49.7305	52.0089	58.6636	66.1628	69.5227 (72)
Total internal gains	614.7590	609.5239	584.9805	547.1775	508.4889	474.2085	454.5346	463.9018	486.0070	524.0342	566.0452	597.8088 (73)

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
North	0.7190	13.4684	0.7300	0.7200	0.7700	3.5272 (74)
East	7.2440	25.1733	0.7300	0.7200	0.7700	66.4212 (76)
West	3.6130	25.1733	0.7300	0.7200	0.7700	33.1281 (80)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)	21.0000 (85)
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Utilisation factor for gains for living area, nil,m (see Table 9a)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8278	0.8038	0.7488	0.6600	0.5409	0.3720	0.2415	0.2418	0.4601	0.6626	0.7810	0.8363 (94)
Useful gains	594.2366	627.7910	652.9973	639.7536	539.4693	382.1627	232.6137	222.0221	385.5053	494.4782	542.0723	569.6726 (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												
	1239.9032	1218.8996	1115.2449	936.8465	686.1190	426.4617	243.7146	232.6024	456.5442	727.4951	990.6703	1212.1806 (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												
	480.3759	397.2249	343.9122	213.9068	109.1074	0.0000	0.0000	0.0000	0.0000	173.3645	322.9906	478.0260 (98)
Space heating												2518.9084 (98)
Space heating per m2												26.3926 (99)
										(98) / (4) =		

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													2792.5814 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	480.3759	397.2249	343.9122	213.9068	109.1074	0.0000	0.0000	0.0000	0.0000	173.3645	322.9906	478.0260	(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)	532.5675	440.3824	381.2774	237.1473	120.9617	0.0000	0.0000	0.0000	0.0000	192.2001	358.0826	529.9623	(211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating requirement	107.9890	94.1916	97.7438	87.5212	85.1676	74.8508	71.7613	80.7666	81.2231	92.4480	98.2890	104.6817	(64)
Efficiency of water heater (217)m	87.3056	87.1816	86.7328	85.7051	83.5816	76.4000	76.4000	76.4000	76.4000	84.8684	86.5525	87.3651	(217)
Fuel for water heating, kWh/month	123.6908	108.0406	112.6953	102.1191	101.8975	97.9723	93.9284	105.7154	106.3129	108.9310	113.5600	119.8210	(219)
Water heating fuel used												1294.6842	(219)
Annual totals kWh/year													
Space heating fuel - main system												2792.5814	(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)													430.9551 (232)
Total delivered energy for all uses													4593.2207 (238)

10a. Fuel costs - using BEDF prices (540)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2792.5814	7.6100	212.5154 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1294.6842	7.6100	98.5255 (247)
Pumps and fans for heating	75.0000	31.0800	23.3100 (249)
Energy for lighting	430.9551	31.0800	133.9408 (250)
Additional standing charges			105.0000 (251)
Total energy cost			573.2918 (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	2792.5814	0.2160	603.1976 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1294.6842	0.2160	279.6518 (264)
Space and water heating			882.8494 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	430.9551	0.5190	223.6657 (268)
Total kg/year			1145.4401 (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	2792.5814	1.2200	3406.9493 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1294.6842	1.2200	1579.5147 (264)
Space and water heating			4986.4641 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	430.9551	3.0700	1323.0321 (268)
Primary energy kWh/year			6539.7462 (272)
Primary energy kWh/m2/year			68.5221 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating:
Current environmental impact rating:

B 85
B 88

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

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

(For testing purposes):

A	Not considered
B	Not considered
C	Not considered
D	Not considered
E Low energy lighting	Already installed
F	Not considered
G	Not considered
H	Not considered
I	Not considered
J	Not considered
K	Not considered
M	Not considered
N Solar water heating	SAP increase too small
O	Not considered
P	Not considered
R	Not considered
S	Not considered
T	Not considered
U Solar photovoltaic panels	Recommended
A2	Not considered
A3	Not considered
T2	Not considered
W	Not considered
X	Not considered
Y	Not considered
J2	Not considered
Q2	Not considered
Z1	Not considered
Z2	Not considered
Z3	Not considered
Z4	Not considered
Z5	Not considered
V2 Wind turbine	Not applicable
L2	Not considered
Q3	Not considered
O3	Not considered

Recommended measures:	SAP change	Cost change	CO2 change
U Solar photovoltaic panels	+ 9.5	-£ 605	-1010 kg (88.2%)
Measures omitted - SAP change or cost saving too small:			
N Solar water heating	+ 0.9	-£ 46	-148 kg (12.9%)

Recommended measures	Typical annual savings		Energy efficiency	Environmental impact
Solar photovoltaic panels	£605	10.58 kg/m²	A 95	A 96
Total Savings	£605	10.58 kg/m²		
Potential energy efficiency rating:			A 95	
Potential environmental impact rating:				A 96

Fuel prices for cost data on this page from database revision number 540 TEST (28 Mar 2024)
Recommendation texts revision number 4.9c (22 Feb 2014)

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

	Current	Potential	Saving
Electricity	£157	£157	£0
Mains gas	£416	£416	£0
Space heating	£341	£341	£0
Water heating	£99	£99	£0
Lighting	£134	£134	£0
Generated (PV)	-£0	-£605	£605
Total cost of fuels	£573	-£32	£605
Total cost of uses	£574	-£31	£605
Delivered energy	48 kWh/m²	28 kWh/m²	20 kWh/m²
Carbon dioxide emissions	1.1 tonnes	0.1 tonnes	1.0 tonnes
CO2 emissions per m²	12 kg/m²	1 kg/m²	11 kg/m²
Primary energy	69 kWh/m²	6 kWh/m²	63 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	47.7200 (1b)	x 2.3700 (2b)	= 113.0964 (1b) - (3b)
First floor	47.7200 (1c)	x 2.6200 (2c)	= 125.0264 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	95.4400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 238.1228 (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) = 0.1680 (8)
Pressure test					Yes
Measured/design AP50					4.4600
Infiltration rate					0.3910 (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) =	0.3617 (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	0.4611	0.4521	0.4430	0.3978	0.3888	0.3436	0.3436	0.3345	0.3617	0.3888	0.4069	0.4249 (22b)
Effective ac	0.6063	0.6022	0.5981	0.5791	0.5756	0.5590	0.5590	0.5560	0.5654	0.5756	0.5828	0.5903 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Solid Door			2.0900	1.2000	2.5080		(26)
Windows (Uw = 1.40)			11.5800	1.3258	15.3390		(27)
Flr - Ground			47.7150	0.1800	8.5887	75.6000	3607.2540 (28a)
Wl - Brick (Timber Frame)	97.6560	13.6650	83.9910	0.2100	17.6381	7.4000	621.5334 (29a)
Rf - Ins Joist	47.7150		47.7150	0.0800	3.8172	7.4000	353.0910 (30)
Total net area of external elements Aum(A, m ²)			193.0810				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	47.8910		(33)
Party Wall			46.7690	0.0000	0.0000	7.4000	346.0906 (32)
Stud			74.4133			7.4000	550.6581 (32c)
Internal Floor			47.7150			7.4000	353.0910 (32d)
Internal Ceiling			47.7150			7.4000	353.0910 (32e)

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

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
47.6444	47.3200	47.0020	45.5085	45.2290	43.9282	43.9282	43.6873	44.4293	45.2290	45.7943	46.3853 (38)	
Heat transfer coeff												
112.3956	112.0712	111.7532	110.2597	109.9802	108.6794	108.6794	108.4385	109.1805	109.9802	110.5455	111.1365 (39)	
Average = Sum(39)m / 12 =												110.2583 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1777	1.1743	1.1709	1.1553	1.1523	1.1387	1.1387	1.1362	1.1440	1.1523	1.1583	1.1645 (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												2.6931 (42)
Average daily hot water use (litres/day)												98.1614 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
107.9776	104.0511	100.1247	96.1982	92.2718	88.3453	88.3453	92.2718	96.1982	100.1247	104.0511	107.9776 (44)	
Energy conte	160.1276	140.0487	144.5177	125.9940	120.8942	104.3225	96.6702	110.9304	112.2553	130.8227	142.8032	155.0751 (45)
Energy content (annual)												Total = Sum(45)m = 1544.4617 (45)
Distribution loss (46)m = 0.15 x (45)m												

	24.0191	21.0073	21.6777	18.8991	18.1341	15.6484	14.5005	16.6396	16.8383	19.6234	21.4205	23.2613 (46)	
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)	
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)	
Combi loss	0.6708	0.6086	0.6503	0.5454	0.5020	0.4147	0.3843	0.4606	0.4859	0.5887	0.6206	0.6496 (61)	
Total heat required for water heating calculated for each month	160.7984	140.6573	145.1680	126.5394	121.3962	104.7373	97.0545	111.3910	112.7412	131.4114	143.4239	155.7247 (62)	
WWHRS	-52.8094	-46.4657	-47.4242	-39.0182	-36.2287	-29.8865	-25.2932	-30.6245	-31.5182	-38.9634	-45.1348	-51.0429 eq. (G10)	
Total of WWHRS savings												-474.4098	
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)	
								Solar input (sum of months) = Sum(63)m =					0.0000 (63)
Output from w/h	107.9890	94.1916	97.7438	87.5212	85.1676	74.8508	71.7613	80.7666	81.2231	92.4480	98.2890	104.6817 (64)	
								Total per year (kWh/year) = Sum(64)m =					1076.6336 (64)
Heat gains from water heating, kWh/month	53.4101	46.7183	48.2147	42.0294	40.3228	34.7909	32.2389	36.9995	37.4464	43.6457	47.6372	51.7249 (65)	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8520	0.8257	0.7801	0.7056	0.6057	0.4764	0.3518	0.3858	0.5644	0.7315	0.8215	0.8611 (94)
Useful gains	592.3483	633.1149	658.5931	653.8359	590.6993	454.0379	320.1598	329.4253	444.6702	519.8198	547.3599	571.7510 (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	1342.6468	1314.3858	1209.7858	1029.7578	806.3438	544.1769	352.8323	370.2112	578.4516	856.4896	1114.5746	1331.3791 (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	558.2221	457.8140	410.0874	270.6638	160.4395	0.0000	0.0000	0.0000	0.0000	250.4823	408.3946	565.1633 (98)
Space heating												3081.2670 (98)
Space heating per m2												32.2849 (99)
										(98) / (4) =		

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Built)

CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

8c. Space cooling requirement

Not applicable

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													90.2000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													3416.0388 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	558.2221	457.8140	410.0874	270.6638	160.4395	0.0000	0.0000	0.0000	0.0000	250.4823	408.3946	565.1633	(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)	618.8716	507.5544	454.6423	300.0707	177.8708	0.0000	0.0000	0.0000	0.0000	277.6966	452.7656	626.5668	(211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	107.9890	94.1916	97.7438	87.5212	85.1676	74.8508	71.7613	80.7666	81.2231	92.4480	98.2890	104.6817	(64)
Efficiency of water heater (217)m	87.6342	87.5030	87.1695	86.3872	84.8833	76.4000	76.4000	76.4000	76.4000	86.0117	87.1465	87.7237	(216)
Fuel for water heating, kWh/month	123.2270	107.6438	112.1308	101.3127	100.3349	97.9723	93.9284	105.7154	106.3129	107.4830	112.7860	119.3311	(219)
Water heating fuel used												1288.1783	(219)
Annual totals kWh/year													
Space heating fuel - main system												3416.0388	(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)													430.9551 (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												3482.9328	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	3416.0388	3.4800	118.8782 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1288.1783	3.4800	44.8286 (247)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	430.9551	13.1900	56.8430 (250)
Additional standing charges			120.0000 (251)
Energy saving/generation technologies			
PV Unit	-1727.2394	13.1900	-227.8229 (252)
Total energy cost			122.6194 (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] =	0.3667 (257)
SAP value		94.8845
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	3416.0388	0.2160	737.8644 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1288.1783	0.2160	278.2465 (264)
Space and water heating			1016.1109 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	430.9551	0.5190	223.6657 (268)
Energy saving/generation technologies			
PV Unit	-1727.2394	0.5190	-896.4372 (269)
Total kg/year			382.2643 (272)
CO2 emissions per m2			4.0100 (273)
EI value			96.3526
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	47.7200 (1b)	x 2.3700 (2b)	= 113.0964 (1b) - (3b)
First floor	47.7200 (1c)	x 2.6200 (2c)	= 125.0264 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	95.4400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 238.1228 (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) = 0.1680 (8)
Pressure test					Yes
Measured/design AP50					4.4600
Infiltration rate					0.3910 (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) =	0.3617 (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	0.4430	0.4159	0.4069	0.3797	0.3797	0.3707	0.3707	0.3617	0.3617	0.3888	0.3888	0.3978 (22b)
	0.5981	0.5865	0.5828	0.5721	0.5721	0.5687	0.5687	0.5654	0.5654	0.5756	0.5756	0.5791 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Solid Door			2.0900	1.2000	2.5080		(26)
Windows (Uw = 1.40)			11.5800	1.3258	15.3390		(27)
Flr - Ground			47.7150	0.1800	8.5887	75.6000	3607.2540 (28a)
Wl - Brick (Timber Frame)	97.6560	13.6650	83.9910	0.2100	17.6381	7.4000	621.5334 (29a)
Rf - Ins Joist	47.7150		47.7150	0.0800	3.8172	7.4000	353.0910 (30)
Total net area of external elements Aum(A, m ²)			193.0810				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	47.8910		(33)
Party Wall			46.7690	0.0000	0.0000	7.4000	346.0906 (32)
Stud			74.4133			7.4000	550.6581 (32c)
Internal Floor			47.7150			7.4000	353.0910 (32d)
Internal Ceiling			47.7150			7.4000	353.0910 (32e)

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

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	47.0020	46.0866	45.7943	44.9560	44.9560	44.6894	44.6894	44.4293	44.4293	45.2290	45.2290	45.5085 (38)
Heat transfer coeff	111.7532	110.8378	110.5455	109.7072	109.7072	109.4407	109.4407	109.1805	109.1805	109.9802	109.9802	110.2597 (39)
Average = Sum(39)m / 12 =												110.0011 (39)
HLP	1.1709	1.1613	1.1583	1.1495	1.1495	1.1467	1.1467	1.1440	1.1440	1.1523	1.1523	1.1553 (40)
HLP (average)												1.1526 (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												2.6931 (42)
Average daily hot water use (litres/day)												98.1614 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	107.9776	104.0511	100.1247	96.1982	92.2718	88.3453	88.3453	92.2718	96.1982	100.1247	104.0511	107.9776 (44)
Energy conte	160.1276	140.0487	144.5177	125.9940	120.8942	104.3225	96.6702	110.9304	112.2553	130.8227	142.8032	155.0751 (45)
Energy content (annual)										Total = Sum(45)m =		1544.4617 (45)
Distribution loss (46)m = 0.15 x (45)m												

	24.0191	21.0073	21.6777	18.8991	18.1341	15.6484	14.5005	16.6396	16.8383	19.6234	21.4205	23.2613 (46)
Water storage loss:												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	0.6708	0.6086	0.6503	0.5454	0.5020	0.4147	0.3843	0.4606	0.4859	0.5887	0.6206	0.6496 (61)
Total heat required for water heating calculated for each month												
WWHRS	160.7984	140.6573	145.1680	126.5394	121.3962	104.7373	97.0545	111.3910	112.7412	131.4114	143.4239	155.7247 (62)
Total of WWHRS savings	-52.8094	-46.4657	-47.4242	-39.0182	-36.2287	-29.8865	-25.2932	-30.6245	-31.5182	-38.9634	-45.1348	-51.0429 eq. (G10)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-474.4098
Output from w/h								Solar input	(sum of months) =	Sum(63)m =		0.0000 (63)
	107.9890	94.1916	97.7438	87.5212	85.1676	74.8508	71.7613	80.7666	81.2231	92.4480	98.2890	104.6817 (64)
								Total per year (kWh/year) =	Sum(64)m =			1076.6336 (64)
Heat gains from water heating, kWh/month												
	53.4101	46.7183	48.2147	42.0294	40.3228	34.7909	32.2389	36.9995	37.4464	43.6457	47.6372	51.7249 (65)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	161.5868	161.5868	161.5868	161.5868	161.5868	161.5868	161.5868	161.5868	161.5868	161.5868	161.5868	161.5868 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	61.0062	54.1851	44.0663	33.3610	24.9378	21.0535	22.7491	29.5701	39.6889	50.3942	58.8175	62.7017 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	371.2510	375.1034	365.3954	344.7283	318.6397	294.1202	277.7396	273.8872	283.5951	304.2623	330.3508	354.8704 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518	53.8518 (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)	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245	-107.7245 (71)
Water heating gains (Table 5)	71.7878	69.5213	64.8047	58.3741	54.1974	48.3207	43.3319	49.7305	52.0089	58.6636	66.1628	69.5227 (72)
Total internal gains	614.7590	609.5239	584.9805	547.1775	508.4889	474.2085	454.5346	463.9018	486.0070	524.0342	566.0452	597.8088 (73)

[Jan	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
North	0.7190	13.4684	0.7300	0.7200	0.7700	3.5272 (74)
East	7.2440	25.1733	0.7300	0.7200	0.7700	66.4212 (76)
West	3.6130	25.1733	0.7300	0.7200	0.7700	33.1281 (80)

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													2792.5814 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	480.3759	397.2249	343.9122	213.9068	109.1074	0.0000	0.0000	0.0000	0.0000	173.3645	322.9906	478.0260	(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)	532.5675	440.3824	381.2774	237.1473	120.9617	0.0000	0.0000	0.0000	0.0000	192.2001	358.0826	529.9623	(211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating requirement	107.9890	94.1916	97.7438	87.5212	85.1676	74.8508	71.7613	80.7666	81.2231	92.4480	98.2890	104.6817	(64)
Efficiency of water heater (217)m	87.3056	87.1816	86.7328	85.7051	83.5816	76.4000	76.4000	76.4000	76.4000	84.8684	86.5525	76.4000	(216)
Fuel for water heating, kWh/month	123.6908	108.0406	112.6953	102.1191	101.8975	97.9723	93.9284	105.7154	106.3129	108.9310	113.5600	119.8210	(219)
Water heating fuel used												1294.6842	(219)
Annual totals kWh/year													
Space heating fuel - main system												2792.5814	(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)												430.9551	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV Unit 0 (0.80 * 2.50 * 1217 * 0.80) =									-1946.4459			-1946.4459	(233)
Total delivered energy for all uses												2646.7748	(238)

10a. Fuel costs - using BEDF prices (540)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2792.5814	7.6100	212.5154 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1294.6842	7.6100	98.5255 (247)
Pumps and fans for heating	75.0000	31.0800	23.3100 (249)
Energy for lighting	430.9551	31.0800	133.9408 (250)
Additional standing charges			105.0000 (251)
Energy saving/generation technologies			
PV Unit	-1946.4459	31.0800	-604.9554 (252)
Total energy cost			-31.6636 (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	2792.5814	0.2160	603.1976 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1294.6842	0.2160	279.6518 (264)
Space and water heating			882.8494 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	430.9551	0.5190	223.6657 (268)
Energy saving/generation technologies			
PV Unit	-1946.4459	0.5190	-1010.2054 (269)
Total kg/year			135.2346 (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	2792.5814	1.2200	3406.9493 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1294.6842	1.2200	1579.5147 (264)
Space and water heating			4986.4641 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	430.9551	3.0700	1323.0321 (268)
Energy saving/generation technologies			
PV Unit	-1946.4459	3.0700	-5975.5890 (269)
Primary energy kWh/year			564.1572 (272)
Primary energy kWh/m2/year			5.9111 (273)

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Built)

Property Reference	038 - PRJ013014	Issued on Date	02/05/2024
Assessment Reference	038	Prop Type Ref	C
Property	31 Deeble Way, Netley Abbey, Southampton, SO31 5JP		
SAP Rating	85 B	DER	14.37
Environmental	88 B	TER	17.40
CO ₂ Emissions (t/year)	1.15	% DER<TER	17.40
General Requirements Compliance	Pass	DFEE	44.32
		TFEE	50.23
		% DFEE<TFEE	11.77
Assessor Details	Mr. Christopher Nicholls, Briary Energy Limited, Tel: 0203 397 1373, chris@briaryenergy.co.uk		Assessor ID
			U903-0001
Client			

SUMMARY FOR INPUT DATA FOR New Build (As Built)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	17.40	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	14.37	kgCO ₂ /m ²	Pass
	-3.03 (-17.4%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	50.23	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	44.32	kWh/m ² /yr	
	-5.9 (-11.8%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.21 (max. 0.30)	0.21 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.18 (max. 0.25)	0.18 (max. 0.70)	Pass
Roof	0.08 (max. 0.20)	0.08 (max. 0.35)	Pass
Openings	1.37 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	4.46 (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

0.72 m², No overhang

Windows facing East

7.24 m², No overhang

Windows facing West

3.61 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

4.46 (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