

PREDICTED ENERGY ASSESSMENT

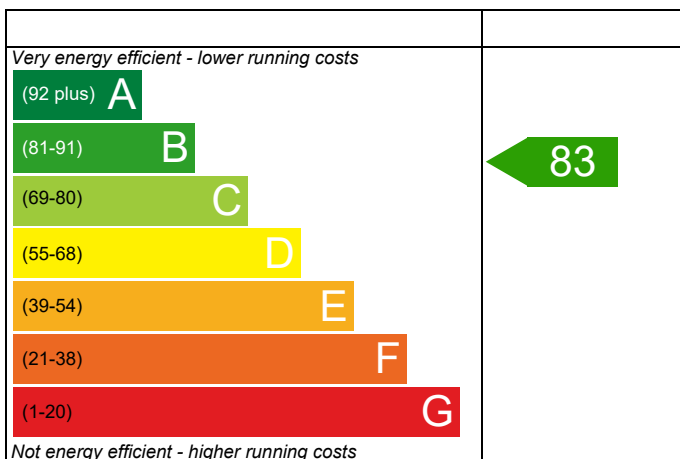
Lancing Phase 2,
BN15

Dwelling type: Flat, Semi-Detached
Date of assessment: 26/01/2024
Produced by: Michael Jukes
Total floor area: 70.27 m²

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

The energy performance has been assessed using the Government approved SAP2012 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.

Energy Efficiency Rating

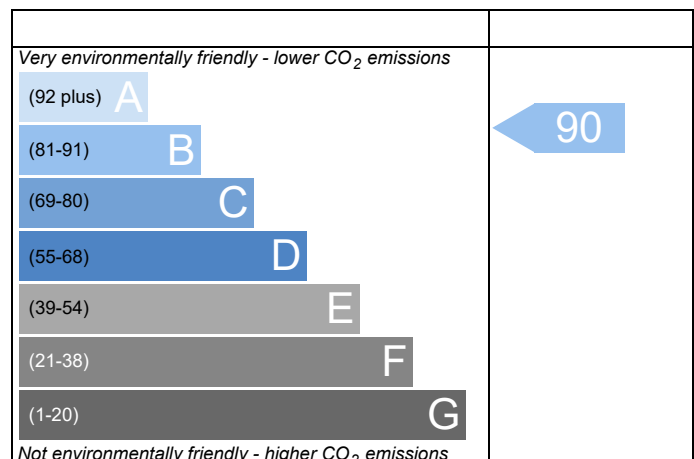


England

EU Directive
2002/91/EC

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

Environmental Impact (CO₂) Rating



England

EU Directive
2002/91/EC

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

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

Property Reference	401 - PRJ012992	Issued on Date	26/01/2024
Assessment Reference	401	Prop Type Ref	PRJ012992
Property	Lancing Phase 2, BN15		

SAP Rating	83 B	DER	13.25	TER	19.82
Environmental	90 B	% DER<TER	33.13		
CO ₂ Emissions (t/year)	0.70	DFEE	45.94	TFEE	55.66
General Requirements Compliance	Pass	% DFEE<TFEE	17.46		

Assessor Details	Mr. Michael Juckes, Michael Juckes, Tel: 02033971373, michael@briaryenergy.co.uk	Assessor ID	T850-0001
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Client	
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CALCULATION OF HEAT DEMAND 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	70.2700 (1b)	x 2.6000 (2b)	= 182.7020 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.2700		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 182.7020 (5)
Dwelling volume			

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					2 * 10 = 20.0000 (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) =					Air changes per hour 20.0000 / (5) = 0.1095 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3595 (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) =	0.3325 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.7000	5.2000	4.9000	4.5000	4.6000	4.2000	4.3000	4.2000	4.5000	4.9000	4.9000	5.2000 (22)
Wind factor	1.4250	1.3000	1.2250	1.1250	1.1500	1.0500	1.0750	1.0500	1.1250	1.2250	1.2250	1.3000 (22a)
Adj infilt rate												
Effective ac	0.4738	0.4323	0.4073	0.3741	0.3824	0.3491	0.3574	0.3491	0.3741	0.4073	0.4073	0.4323 (22b)
	0.6123	0.5934	0.5830	0.5700	0.5731	0.5609	0.5639	0.5609	0.5700	0.5830	0.5830	0.5934 (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			2.1500	1.0900	2.3435		(26)
Windows (Uw = 1.40)			11.6400	1.3258	15.4318		(27)
Corridor	28.2230	2.1460	26.0770	0.2147	5.5985	58.4800	1524.9830 (29a)
Brick High Strength	5.5710		3.7490	0.2600	0.9747	58.4800	219.2415 (29a)
Clad High Strength	39.2920	9.8180	29.4740	0.2400	7.0738	58.4800	1723.6395 (29a)
W1 - Dormer	0.2840		0.2840	0.4400	0.1250	9.0000	2.5560 (29a)
Rf - Ins Joist	66.9820		66.9820	0.1000	6.6982	7.4000	495.6668 (30)
Rf - Ins Rafter	3.6150		3.6150	0.1800	0.6507	5.6000	20.2440 (30)
Flat over Dormer	0.7220		0.7220	0.3300	0.2383	9.0000	6.4980 (30)
Total net area of external elements Aum(A, m ²)			144.6930				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	39.1345		(33)
Party Wall			14.4670	0.0000	0.0000	7.4000	107.0558 (32)
Party Floor			70.2710			20.1600	1416.6634 (32d)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		5516.5480 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							78.5050 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.4115 (36)
Total fabric heat loss						(33) + (36) =	46.5460 (37)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF HEAT DEMAND 09 Jan 2014

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	36.9138	35.7785	35.1474	34.3641	34.5537	33.8204	33.9975	33.8204	34.3641	35.1474	35.1474	35.7785 (38)
Average = Sum (39)m / 12 =	83.4598	82.3246	81.6934	80.9101	81.0997	80.3664	80.5435	80.3664	80.9101	81.6934	81.6934	82.3246 (39)
												81.4488 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1877	1.1715	1.1626	1.1514	1.1541	1.1437	1.1462	1.1437	1.1514	1.1626	1.1626	1.1715 (40)
Days in month												1.1591 (40)
	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												
Average daily hot water use (litres/day)												2.2527 (42)
												87.7007 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	96.4708	92.9628	89.4547	85.9467	82.4387	78.9307	78.9307	82.4387	85.9467	89.4547	92.9628	96.4708 (44)
Energy conte	143.0634	125.1242	129.1169	112.5673	108.0110	93.2053	86.3684	99.1090	100.2926	116.8814	127.5852	138.5493 (45)
Energy content (annual)												Total = Sum (45)m =
Distribution loss (46)m = 0.15 x (45)m	21.4595	18.7686	19.3675	16.8851	16.2016	13.9808	12.9553	14.8663	15.0439	17.5322	19.1378	20.7824 (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	0.0000 (57)
Combi loss	16.2027	14.5997	16.1082	15.5254	15.9970	15.4281	15.9094	15.9662	15.4811	16.0622	15.6172	16.1844 (61)
Total heat required for water heating calculated for each month	159.2661	139.7239	145.2251	128.0927	124.0080	108.6333	102.2778	115.0752	115.7738	132.9436	143.2024	154.7337 (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	159.2661	139.7239	145.2251	128.0927	124.0080	108.6333	102.2778	115.0752	115.7738	132.9436	143.2024	154.7337 (64)
												Total per year (kWh/year) = Sum (64)m =
												1568.9557 (64)
												1569 (64)
RHI water heating demand												
Heat gains from water heating, kWh/month	51.6193	45.2537	46.9584	41.3100	39.9129	34.8478	32.6948	36.9453	37.2176	42.8786	46.3264	50.1137 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	45.4786	40.3937	32.8503	24.8698	18.5905	15.6949	16.9589	22.0438	29.5871	37.5676	43.8470	46.7426 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	295.4125	298.4780	290.7531	274.3078	253.5486	234.0379	221.0035	217.9380	225.6629	242.1082	262.8674	282.3782 (68)
Pumps, fans	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686 (69)
Losses e.g. evaporation (negative values) (Table 5)	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)
Water heating gains (Table 5)	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065 (71)
Total internal gains	69.3807	67.3418	63.1162	57.3750	53.6464	48.3997	43.9447	49.6576	51.6911	57.6326	64.3422	67.3572 (72)
	509.0937	505.0354	485.5415	455.3745	424.6074	396.9543	380.7289	388.4613	405.7629	436.1302	469.8785	495.2998 (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				4.6000	13.4530	0.7300	0.7200	0.7700	22.5407 (74)			
East				7.0400	25.1540	0.7300	0.7200	0.7700	64.5013 (76)			
Solar gains	87.0419	146.8778	246.8062	384.3259	465.8849	522.7965	484.5098	412.1146	306.9175	187.6448	107.9819	70.5434 (83)
Total gains	596.1357	651.9132	732.3477	839.7004	890.4922	919.7508	865.2387	800.5759	712.6805	623.7750	577.8604	565.8432 (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)												21.0000 (85)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	18.3606	18.6138	18.7576	18.9392	18.8949	19.0673	19.0254	19.0673	18.9392	18.7576	18.7576	18.6138
alpha	2.2240	2.2409	2.2505	2.2626	2.2597	2.2712	2.2684	2.2712	2.2626	2.2505	2.2505	2.2409
util living area	0.8962	0.8762	0.8258	0.7283	0.5965	0.4409	0.3389	0.3377	0.5474	0.7470	0.8552	0.9020 (86)
MIT	18.7915	18.9833	19.4579	20.0692	20.5625	20.8460	20.9390	20.9444	20.7454	20.2177	19.4926	18.8072 (87)
Th 2	19.9299	19.9428	19.9501	19.9591	19.9569	19.9653	19.9633	19.9653	19.9591	19.9501	19.9501	19.9428 (88)
util rest of house	0.8834	0.8615	0.8051	0.6962	0.5473	0.3744	0.2567	0.2486	0.4765	0.7062	0.8344	0.8897 (89)
MIT 2	17.9562	18.1502	18.6130	19.1955	19.6383	19.8759	19.9383	19.9445	19.8027	19.3430	18.6570	17.9817 (90)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF HEAT DEMAND 09 Jan 2014

Living area fraction									fLA = Living area / (4) =		0.4229 (91)	
MIT	18.3095	18.5026	18.9703	19.5650	20.0292	20.2862	20.3615	20.3674	20.2014	19.7129	19.0104	18.3309 (92)
Temperature adjustment												-0.1500
adjusted MIT	18.1595	18.3526	18.8203	19.4150	19.8792	20.1362	20.2115	20.2174	20.0514	19.5629	18.8604	18.1809 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8568	0.8343	0.7788	0.6775	0.5434	0.3859	0.2771	0.2711	0.4832	0.6890	0.8083	0.8637 (94)
Useful gains	510.7736	543.9119	570.3819	568.9134	483.8628	354.9229	239.7144	217.0512	344.3825	429.8060	467.0760	488.7378 (95)
Ext temp.	5.4000	5.6000	7.1000	9.5000	12.6000	15.3000	17.1000	17.4000	15.1000	12.0000	8.6000	5.6000 (96)
Heat loss rate W												
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												
Space heating	412.2733	339.9908	287.9972	167.9828	79.2196	0.0000	0.0000	0.0000	0.0000	139.8977	267.2135	406.9502 (98)
RHI space heating demand												2101.5251 (98)
												2102 (98)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	70.2700 (1b)	x 2.6000 (2b)	= 182.7020 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.2700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 182.7020 (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					2 * 10 = 20.0000 (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) =				Air changes per hour
Pressure test					20.0000 / (5) = 0.1095 (8)
Measured/design AP50					Yes
Infiltration rate					5.0000
Number of sides sheltered					0.3595 (18)
					1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =				0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =				0.3325 (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	0.4239	0.4156	0.4073	0.3658	0.3574	0.3159	0.3159	0.3076	0.3325	0.3574	0.3741	0.3907 (22b)
Effective ac	0.5899	0.5864	0.5830	0.5669	0.5639	0.5499	0.5499	0.5473	0.5553	0.5639	0.5700	0.5763 (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			2.1500	1.0900	2.3435		(26)
Windows (Uw = 1.40)			11.6400	1.3258	15.4318		(27)
Corridor	28.2230	2.1460	26.0770	0.2147	5.5985	58.4800	1524.9830 (29a)
Brick High Strength	5.5710	1.8220	3.7490	0.2600	0.9747	58.4800	219.2415 (29a)
Clad High Strength	39.2920	9.8180	29.4740	0.2400	7.0738	58.4800	1723.6395 (29a)
Wl - Dormer	0.2840		0.2840	0.4400	0.1250	9.0000	2.5560 (29a)
Rf - Ins Joist	66.9820		66.9820	0.1000	6.6982	7.4000	495.6668 (30)
Rf - Ins Rafter	3.6150		3.6150	0.1800	0.6507	5.6000	20.2440 (30)
Flat over Dormer	0.7220		0.7220	0.3300	0.2383	9.0000	6.4980 (30)
Total net area of external elements Aum(A, m ²)			144.6930				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		39.1345		(33)
Party Wall			14.4670	0.0000	0.0000	7.4000	107.0558 (32)
Party Floor			70.2710			20.1600	1416.6634 (32d)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	5516.5480 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							78.5050 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.4115 (36)
Total fabric heat loss						(33) + (36) =	46.5460 (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	35.5640	35.3536	35.1474	34.1787	33.9975	33.1538	33.1538	32.9976	33.4788	33.9975	34.3641	34.7474 (38)
Heat transfer coeff	82.1100	81.8996	81.6934	80.7247	80.5435	79.6998	79.6998	79.5436	80.0248	80.5435	80.9101	81.2934 (39)
Average = Sum(39)m / 12 =												80.7239 (39)
HLP	1.1685	1.1655	1.1626	1.1488	1.1462	1.1342	1.1342	1.1320	1.1388	1.1462	1.1514	1.1569 (40)
HLP (average)												1.1488 (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												2.2527 (42)
Average daily hot water use (litres/day)												87.7007 (43)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	96.4708	92.9628	89.4547	85.9467	82.4387	78.9307	78.9307	82.4387	85.9467	89.4547	92.9628	96.4708 (44)
Energy conte	143.0634	125.1242	129.1169	112.5673	108.0110	93.2053	86.3684	99.1090	100.2926	116.8814	127.5852	138.5493 (45)
Energy content (annual)										Total = Sum(45)m =		1379.8739 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

Distribution loss (46)m = 0.15 x (45)m	21.4595	18.7686	19.3675	16.8851	16.2016	13.9808	12.9553	14.8663	15.0439	17.5322	19.1378	20.7824 (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	16.2027	14.5997	16.1082	15.5254	15.9970	15.4281	15.9094	15.9662	15.4811	16.0622	15.6172	16.1844 (61)
Total heat required for water heating calculated for each month	159.2661	139.7239	145.2251	128.0927	124.0080	108.6333	102.2778	115.0752	115.7738	132.9436	143.2024	154.7337 (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	159.2661	139.7239	145.2251	128.0927	124.0080	108.6333	102.2778	115.0752	115.7738	132.9436	143.2024	154.7337 (64)
Heat gains from water heating, kWh/month	51.6193	45.2537	46.9584	41.3100	39.9129	34.8478	32.6948	36.9453	37.2176	42.8786	46.3264	50.1137 (65)
Solar input (sum of months) = Sum(63)m = 0.0000 (63)												
Total per year (kWh/year) = Sum(64)m = 1568.9557 (64)												

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	45.4786	40.3937	32.8503	24.8698	18.5905	15.6949	16.9589	22.0438	29.5871	37.5676	43.8470	46.7426 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	295.4125	298.4780	290.7531	274.3078	253.5486	234.0379	221.0035	217.9380	225.6629	242.1082	262.8674	282.3782 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686 (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)	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065 (71)
Water heating gains (Table 5)	69.3807	67.3418	63.1162	57.3750	53.6464	48.3997	43.9447	49.6576	51.6911	57.6326	64.3422	67.3572 (72)
Total internal gains	509.0937	505.0354	485.5415	455.3745	424.6074	396.9543	380.7289	388.4613	405.7629	436.1302	469.8785	495.2998 (73)

6. Solar gains

[Jan]												Gains	
	Area m2				Solar flux Table 6a W/m2		Specific data or Table 6b		Specific data or Table 6c		Access factor Table 6d		W
North	4.6000				10.6334		0.7300		0.7200		0.7700		17.8163
East	7.0400				19.6403		0.7300		0.7200		0.7700		50.3626 (74)
Solar gains	68.1790	132.5679	220.1042	329.5608	415.1853	430.8813	407.7489	342.0407	258.2630	157.4319	84.7750	56.2684	(83)
Total gains	577.2727	637.6033	705.6457	784.9354	839.7927	827.8356	788.4778	730.5020	664.0259	593.5621	554.6535	551.5682	(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	18.6625	18.7104	18.7576	18.9827	19.0254	19.2268	19.2268	19.2646	19.1487	19.0254	18.9392	18.8499
alpha	2.2442	2.2474	2.2505	2.2655	2.2684	2.2818	2.2818	2.2843	2.2766	2.2684	2.2626	2.2567
util living area	0.9116	0.8886	0.8453	0.7655	0.6535	0.5177	0.4030	0.4434	0.6286	0.8026	0.8863	0.9187 (86)
MIT	18.5506	18.8176	19.2913	19.9018	20.4144	20.7606	20.9031	20.8765	20.6048	19.9434	19.1525	18.4986 (87)
Th 2	19.9453	19.9477	19.9501	19.9612	19.9633	19.9730	19.9730	19.9748	19.9693	19.9633	19.9591	19.9547 (88)
util rest of house	0.9012	0.8756	0.8269	0.7371	0.6103	0.4546	0.3211	0.3604	0.5686	0.7721	0.8709	0.9091 (89)
MIT 2	17.7295	17.9914	18.4529	19.0430	19.5156	19.8205	19.9270	19.9128	19.6991	19.0981	18.3325	17.6852 (90)
Living area fraction	0.9012	0.8756	0.8269	0.7371	0.6103	0.4546	0.3211	0.3604	0.5686	0.7721	0.8709	0.9091 (89)
MIT	18.0768	18.3408	18.8075	19.4062	19.8958	20.2181	20.3398	20.3204	20.0821	19.4556	18.6793	18.0292 (92)
Temperature adjustment	17.9268	18.1908	18.6575	19.2562	19.7458	20.0681	20.1898	20.1704	19.9321	19.3056	18.5293	-0.1500
adjusted MIT	17.9268	18.1908	18.6575	19.2562	19.7458	20.0681	20.1898	20.1704	19.9321	19.3056	18.5293	17.8792 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	505.6156	541.2437	564.5228	561.4851	504.1896	381.4514	267.3992	275.4647	376.0012	444.8962	468.5920	487.9583 (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	1118.8943	1088.5112	993.1870	836.0014	648.0333	435.8058	286.1090	299.9130	466.7164	701.1804	924.7457	1112.0308 (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	456.2793	367.7638	318.9262	197.6517	107.0197	0.0000	0.0000	0.0000	0.0000	190.6754	328.4307	464.3099 (98)
Space heating												2431.0567 (98)
Space heating per m ²												34.5959 (99)

8c. Space cooling requirement

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

Not applicable

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

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													90.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													2686.2505 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	456.2793	367.7638	318.9262	197.6517	107.0197	0.0000	0.0000	0.0000	0.0000	190.6754	328.4307	464.3099	(98)
Space heating efficiency (main heating system 1)	90.5000	90.5000	90.5000	90.5000	90.5000	0.0000	0.0000	0.0000	0.0000	90.5000	90.5000	90.5000	(210)
Space heating fuel (main heating system)	504.1760	406.3688	352.4046	218.3997	118.2538	0.0000	0.0000	0.0000	0.0000	210.6911	362.9068	513.0497	(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	159.2661	139.7239	145.2251	128.0927	124.0080	108.6333	102.2778	115.0752	115.7738	132.9436	143.2024	154.7337	(64)
Efficiency of water heater (217)m	89.6497	89.5958	89.4738	89.2141	88.7537	87.3000	87.3000	87.3000	87.3000	89.1575	89.5039	89.6783	(216)
Fuel for water heating, kWh/month	177.6537	155.9491	162.3101	143.5790	139.7215	124.4368	117.1567	131.8158	132.6160	149.1110	159.9958	172.5430	(219)
Water heating fuel used													(219)
Annual totals kWh/year													
Space heating fuel - main system													2686.2505 (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)													321.2664 (232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV Unit 0 (0.80 * 0.29 * 908 * 1.00) =													-639.1294
PV Unit 1 (0.80 * 0.59 * 908 * 1.00) =													-639.1294 (233)
Total delivered energy for all uses													4210.2762 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2686.2505	3.4800	93.4815 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1766.8887	3.4800	61.4877 (247)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	321.2664	13.1900	42.3750 (250)
Additional standing charges			120.0000 (251)
Energy saving/generation technologies			
PV Unit	0.0000	0.0000	0.0000 (252)
Total energy cost			327.2368 (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] =	1.1923 (257)
SAP value		83.3670
SAP rating (Section 12)		83 (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	2686.2505	0.2160	580.2301 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1766.8887	0.2160	381.6480 (264)
Space and water heating			961.8781 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	321.2664	0.5190	166.7373 (268)
Energy saving/generation technologies			
PV Unit	-639.1294	0.5190	-331.7082 (269)
Total kg/year			835.8322 (272)
CO2 emissions per m2			11.8900 (273)
EI value			90.2836
EI rating			90 (274)
EI band			B

Calculation of stars for heating and DHW

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.9050 = 3.845$, stars = 4
Main heating environmental impact	$0.216 \times (1 + 0.29 \times 0.00) / 0.9050 = 0.2387$, stars = 4
Water heating energy efficiency	$3.48 / 0.8869 = 3.924$, stars = 4
Water heating environmental impact	$0.216 / 0.8869 = 0.2436$, stars = 4

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	70.2700 (1b)	x 2.6000 (2b)	= 182.7020 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.2700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 182.7020 (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					2 * 10 = 20.0000 (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) =					20.0000 / (5) = 0.1095 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3595 (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) = 0.3325 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.7000	5.2000	4.9000	4.5000	4.6000	4.2000	4.3000	4.2000	4.5000	4.9000	4.9000	5.2000 (22)
Wind factor	1.4250	1.3000	1.2250	1.1250	1.1500	1.0500	1.0750	1.0500	1.1250	1.2250	1.2250	1.3000 (22a)
Adj infilt rate												
Effective ac	0.4738	0.4323	0.4073	0.3741	0.3824	0.3491	0.3574	0.3491	0.3741	0.4073	0.4073	0.4323 (22b)
Effective ac	0.6123	0.5934	0.5830	0.5700	0.5731	0.5609	0.5639	0.5609	0.5700	0.5830	0.5830	0.5934 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Solid Door			2.1500	1.0900	2.3435			(26)
Windows (Uw = 1.40)			11.6400	1.3258	15.4318			(27)
Corridor	28.2230	2.1460	26.0770	0.2147	5.5985	58.4800	1524.9830	(29a)
Brick High Strength	5.5710	1.8220	3.7490	0.2600	0.9747	58.4800	219.2415	(29a)
Clad High Strength	39.2920	9.8180	29.4740	0.2400	7.0738	58.4800	1723.6395	(29a)
Wl - Dormer	0.2840		0.2840	0.4400	0.1250	9.0000	2.5560	(29a)
Rf - Ins Joist	66.9820		66.9820	0.1000	6.6982	7.4000	495.6668	(30)
Rf - Ins Rafter	3.6150		3.6150	0.1800	0.6507	5.6000	20.2440	(30)
Flat over Dormer	0.7220		0.7220	0.3300	0.2383	9.0000	6.4980	(30)
Total net area of external elements Aum(A, m2)			144.6930					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	39.1345			(33)
Party Wall			14.4670	0.0000	0.0000	7.4000	107.0558	(32)
Party Floor			70.2710			20.1600	1416.6634	(32d)
Heat capacity Cm = Sum(A x k)				(28)...(30) + (32) + (32a)...(32e) =			5516.5480	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							78.5050	(35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.4115	(36)
Total fabric heat loss						(33) + (36) =	46.5460	(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	36.9138	35.7785	35.1474	34.3641	34.5537	33.8204	33.9975	33.8204	34.3641	35.1474	35.1474	35.7785 (38)
Heat transfer coeff	83.4598	82.3246	81.6934	80.9101	81.0997	80.3664	80.5435	80.3664	80.9101	81.6934	81.6934	82.3246 (39)
Average = Sum(39)m / 12 =												81.4488 (39)
HLP	1.1877	1.1715	1.1626	1.1514	1.1541	1.1437	1.1462	1.1437	1.1514	1.1626	1.1626	1.1715 (40)
HLP (average)												1.1591 (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												2.2527 (42)
Average daily hot water use (litres/day)												87.7007 (43)
Daily hot water use	96.4708	92.9628	89.4547	85.9467	82.4387	78.9307	78.9307	82.4387	85.9467	89.4547	92.9628	96.4708 (44)
Energy conte	143.0634	125.1242	129.1169	112.5673	108.0110	93.2053	86.3684	99.1090	100.2926	116.8814	127.5852	138.5493 (45)
Energy content (annual)										Total = Sum(45)m =		1379.8739 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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

Distribution loss (46)m = 0.15 x (45)m	21.4595	18.7686	19.3675	16.8851	16.2016	13.9808	12.9553	14.8663	15.0439	17.5322	19.1378	20.7824 (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	16.2027	14.5997	16.1082	15.5254	15.9970	15.4281	15.9094	15.9662	15.4811	16.0622	15.6172	16.1844 (61)
Total heat required for water heating calculated for each month	159.2661	139.7239	145.2251	128.0927	124.0080	108.6333	102.2778	115.0752	115.7738	132.9436	143.2024	154.7337 (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	159.2661	139.7239	145.2251	128.0927	124.0080	108.6333	102.2778	115.0752	115.7738	132.9436	143.2024	154.7337 (64)
Heat gains from water heating, kWh/month	51.6193	45.2537	46.9584	41.3100	39.9129	34.8478	32.6948	36.9453	37.2176	42.8786	46.3264	50.1137 (65)
Solar input (sum of months) = Sum(63)m = 0.0000 (63)												
Total per year (kWh/year) = Sum(64)m = 1568.9557 (64)												

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597	135.1597 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	45.4786	40.3937	32.8503	24.8698	18.5905	15.6949	16.9589	22.0438	29.5871	37.5676	43.8470	46.7426 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	295.4125	298.4780	290.7531	274.3078	253.5486	234.0379	221.0035	217.9380	225.6629	242.1082	262.8674	282.3782 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686	50.7686 (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)	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065	-90.1065 (71)
Water heating gains (Table 5)	69.3807	67.3418	63.1162	57.3750	53.6464	48.3997	43.9447	49.6576	51.6911	57.6326	64.3422	67.3572 (72)
Total internal gains	509.0937	505.0354	485.5415	455.3745	424.6074	396.9543	380.7289	388.4613	405.7629	436.1302	469.8785	495.2998 (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				4.6000	13.4530	0.7300	0.7200	0.7700	22.5407 (74)			
East				7.0400	25.1540	0.7300	0.7200	0.7700	64.5013 (76)			
Solar gains	87.0419	146.8778	246.8062	384.3259	465.8849	522.7965	484.5098	412.1146	306.9175	187.6448	107.9819	70.5434 (83)
Total gains	596.1357	651.9132	732.3477	839.7004	890.4922	919.7508	865.2387	800.5759	712.6805	623.7750	577.8604	565.8432 (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)												
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
alpha	18.3606	18.6138	18.7576	18.9392	18.8949	19.0673	19.0254	19.0673	18.9392	18.7576	18.7576	18.6138
util living area	2.2240	2.2409	2.2505	2.2626	2.2597	2.2712	2.2684	2.2712	2.2626	2.2505	2.2505	2.2409
	0.8962	0.8762	0.8258	0.7283	0.5965	0.4409	0.3389	0.3377	0.5474	0.7470	0.8552	0.9020 (86)
MIT	18.7915	18.9833	19.4579	20.0692	20.5625	20.8460	20.9390	20.9444	20.7454	20.2177	19.4926	18.8072 (87)
Th 2	19.9299	19.9428	19.9501	19.9591	19.9569	19.9653	19.9633	19.9653	19.9591	19.9501	19.9501	19.9428 (88)
util rest of house	0.8834	0.8615	0.8051	0.6962	0.5473	0.3744	0.2567	0.2486	0.4765	0.7062	0.8344	0.8897 (89)
MIT 2	17.9562	18.1502	18.6130	19.1955	19.6383	19.8759	19.9383	19.9445	19.8027	19.3430	18.6570	17.9819 (90)
Living area fraction	18.3095	18.5026	18.9703	19.5650	20.0292	20.2862	20.3615	20.3674	20.2014	19.7129	19.0104	18.3309 (92)
Temperature adjustment	18.1595	18.3526	18.8203	19.4150	19.8792	20.1362	20.2115	20.2174	20.0514	19.5629	18.8604	-0.1500
adjusted MIT												18.1809 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.8568	0.8343	0.7788	0.6775	0.5434	0.3859	0.2771	0.2711	0.4832	0.6890	0.8083	0.8637 (94)
Ext temp.	510.7736	543.9119	570.3819	568.9134	483.8628	354.9229	239.7144	217.0512	344.3825	429.8060	467.0760	488.7378 (95)
Heat loss rate W	5.4000	5.6000	7.1000	9.5000	12.6000	15.3000	17.1000	17.4000	15.1000	12.0000	8.6000	5.6000 (96)
Month fracti	1064.9043	1049.8505	957.4749	802.2229	590.3408	388.6673	250.6148	226.4246	400.6177	617.8405	838.2059	1035.7139 (97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000 (97a)
Space heating per m2	412.2733	339.9908	287.9972	167.9828	79.2196	0.0000	0.0000	0.0000	0.0000	139.8977	267.2135	406.9502 (98)
												2101.5251 (98)
												29.9064 (99)

8c. Space cooling requirement

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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

Not applicable

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

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000	(201)
Fraction of space heat from main system(s)													1.0000	(202)
Efficiency of main space heating system 1 (in %)													90.5000	(206)
Efficiency of secondary/supplementary heating system, %													0.0000	(208)
Space heating requirement													2322.1272	(211)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Space heating requirement	412.2733	339.9908	287.9972	167.9828	79.2196	0.0000	0.0000	0.0000	0.0000	139.8977	267.2135	406.9502	(98)	
Space heating efficiency (main heating system 1)	90.5000	90.5000	90.5000	90.5000	90.5000	0.0000	0.0000	0.0000	0.0000	90.5000	90.5000	90.5000	(210)	
Space heating fuel (main heating system)	455.5506	375.6804	318.2289	185.6164	87.5355	0.0000	0.0000	0.0000	0.0000	154.5831	295.2635	449.6688	(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	159.2661	139.7239	145.2251	128.0927	124.0080	108.6333	102.2778	115.0752	115.7738	132.9436	143.2024	154.7337	(64)	
Efficiency of water heater (217)m	89.5849	89.5440	89.4015	89.0872	88.5201	87.3000	87.3000	87.3000	87.3000	88.9120	89.3571	89.5953	(216)	
Fuel for water heating, kWh/month	177.7823	156.0393	162.4415	143.7835	140.0903	124.4368	117.1567	131.8158	132.6160	149.5227	160.2585	172.7030	(219)	
Water heating fuel used												1768.6463	(219)	
Annual totals kWh/year														
Space heating fuel - main system												2322.1272	(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)												321.2664	(232)	
Energy saving/generation technologies (Appendices M ,N and Q)														
PV Unit 0 (0.80 * 0.29 * 1074 * 1.00) =												-756.2931		
PV Unit 1 (0.80 * 0.59 * 1074 * 1.00) =												-756.2931	(233)	
Total delivered energy for all uses												3730.7469	(238)	

10a. Fuel costs - using BEDF prices (535)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2322.1272	7.6100	176.7139 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1768.6463	7.6100	134.5940 (247)
Pumps and fans for heating	75.0000	31.0800	23.3100 (249)
Energy for lighting	321.2664	31.0800	99.8496 (250)
Additional standing charges			105.0000 (251)
Energy saving/generation technologies			
PV Unit	0.0000	0.0000	0.0000 (252)
Total energy cost			539.4675 (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	2322.1272	0.2160	501.5795 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1768.6463	0.2160	382.0276 (264)
Space and water heating			883.6071 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	321.2664	0.5190	166.7373 (268)
Energy saving/generation technologies			
PV Unit	-756.2931	0.5190	-392.5161 (269)
Total kg/year			696.7532 (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	2322.1272	1.2200	2832.9952 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1768.6463	1.2200	2157.7485 (264)
Space and water heating			4990.7437 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	321.2664	3.0700	986.2879 (268)
Energy saving/generation technologies			
PV Unit	-756.2931	3.0700	-2321.8197 (269)
Primary energy kWh/year			3885.4618 (272)
Primary energy kWh/m2/year			55.2933 (273)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 83
Current environmental impact rating: B 90

(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	Not applicable
O	Not considered
P	Not considered
R	Not considered
S	Not considered
T	Not considered
U Solar photovoltaic panels	Not applicable
A2	Not considered
A3	Not considered
T2	Not considered
W	Not considered
X	Not considered
Y	Not considered
J2	Not considered
Q2	Not considered
Z1	Not considered
Z2	Not considered
Z3	Not considered
Z4	Not considered
Z5	Not considered
V2 Wind turbine	Not applicable
L2	Not considered
Q3	Not considered
O3	Not considered

Recommended measures: (none) SAP change Cost change CO2 change

Recommended measures (none)	Typical annual savings	Energy efficiency	Environmental impact
	Total Savings £0		0.00 kg/m ²

Potential energy efficiency rating: B 83
Potential environmental impact rating: B 90

Fuel prices for cost data on this page from database revision number 535 TEST (04 Jan 2024)
Recommendation texts revision number 4.9c (22 Feb 2014)

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

	Current	Potential	Saving
Electricity	£123	£123	£0
Mains gas	£416	£416	£0
Space heating	£305	£305	£0
Water heating	£135	£135	£0
Lighting	£100	£100	£0
Total cost of fuels	£539	£539	£0
Total cost of uses	£540	£540	£0
Delivered energy	53 kWh/m ²	53 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	0.7 tonnes	0.7 tonnes	0.0 tonnes
CO2 emissions per m ²	10 kg/m ²	10 kg/m ²	0 kg/m ²
Primary energy	55 kWh/m ²	55 kWh/m ²	0 kWh/m ²

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

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

No improvements selected / applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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

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

No improvements selected / applicable

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Property Reference	401 - PRJ012992				Issued on Date	26/01/2024
Assessment Reference	401			Prop Type Ref	PRJ012992	
Property	Lancing Phase 2, BN15					
SAP Rating	83 B	DER	13.25	TER	19.82	
Environmental	90 B	% DER<TER	33.13			
CO ₂ Emissions (t/year)	0.70	DFEE	45.94	TFEE	55.66	
General Requirements Compliance	Pass	% DFEE<TFEE	17.46			
Assessor Details	Mr. Michael Juckes, Michael Juckes, Tel: 02033971373, michael@briaryenergy.co.uk				Assessor ID	T850-0001
Client						

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	19.82	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	13.25	kgCO ₂ /m ²	Pass
	-6.57 (-33.1%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	55.66	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	45.94	kWh/m ² /yr	
	-9.8 (-17.6%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.23 (max. 0.30)	0.44 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Roof	0.11 (max. 0.20)	0.33 (max. 0.35)	Pass
Openings	1.35 (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	5.00 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Boiler system with radiators or underfloor - Mains gas Data from database Ideal LOGIC COMBI ESP1 24 Combi boiler Efficiency: 89.6% SEDBUK2009 Minimum: 88.0%	Pass
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BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Secondary heating system

None

5 Cylinder insulation

Hot water storage

No cylinder

6 Controls

Space heating controls

Programmer, room thermostat and TRVs

Pass

Hot water controls

No cylinder

Boiler interlock

Yes

Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100

%

Minimum

75

%

Pass

8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (South East England)

Slight

Pass

Based on:

Overshading

Average

Windows facing North

4.60 m², No overhang

Windows facing East

7.04 m², No overhang

Air change rate

5.19 ach

Blinds/curtains

Dark-coloured curtain or roller blind, closed 100% of daylight hours

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type

U-value

Filled Cavity with Edge Sealing

0.00

W/m²K

Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.00 (design value)

Maximum

10.0

Pass

10 Key features

Party wall U-value

0.00

W/m²K

Roof U-value

0.10

W/m²K

Door U-value

1.09

W/m²K

Photovoltaic array

0.88

kW