

PREDICTED ENERGY ASSESSMENT

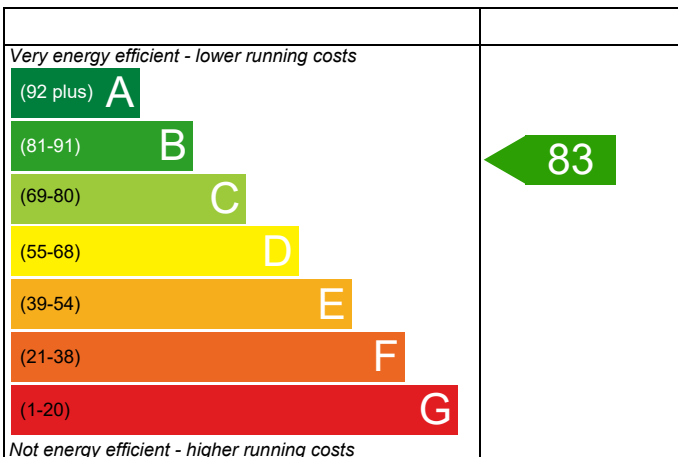
Lancing Phase 2,
BN15

Dwelling type: Flat, Semi-Detached
Date of assessment: 26/01/2024
Produced by: Michael Juckes
Total floor area: 70.37 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

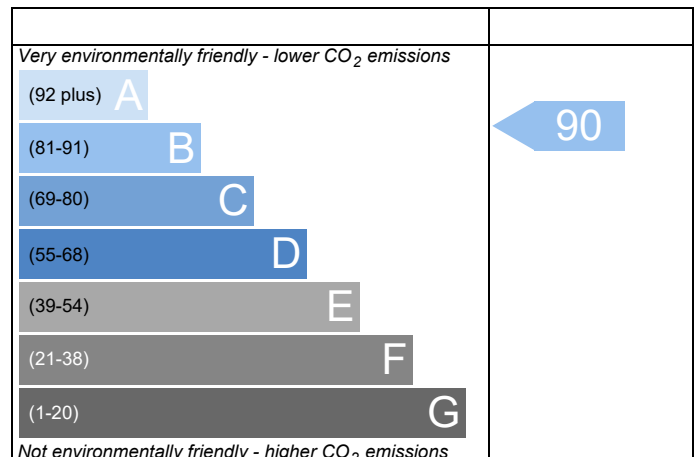


England

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	400 - PRJ012992	Issued on Date	26/01/2024
Assessment Reference	400	Prop Type Ref	PRJ012992
Property	Lancing Phase 2, BN15		

SAP Rating	83 B	DER	13.24	TER	19.79
Environmental	90 B	% DER<TER	33.11		
CO ₂ Emissions (t/year)	0.70	DFEE	45.42	TFEE	54.91
General Requirements Compliance	Pass	% DFEE<TFEE	17.28		

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	70.3700 (1b)	x 2.5800 (2b)	= 181.5546 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.3700		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 181.5546 (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) = 0.1102 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3602 (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) =				0.3331 (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	0.4747	0.4331	0.4081	0.3748	0.3831	0.3498	0.3581	0.3498	0.3748	0.4081	0.4081	0.4331 (22b)
Effective ac	0.6127	0.5938	0.5833	0.5702	0.5734	0.5612	0.5641	0.5612	0.5702	0.5833	0.5833	0.5938 (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)			10.5400	1.3258	13.9735		(27)
Corridor	6.8830	2.1460	4.7370	0.2147	1.0170	58.4800	277.0198 (29a)
Brick High Strength	15.5740	3.4960	12.0780	0.2600	3.1403	58.4800	706.3214 (29a)
Clad High Strength	44.0420	7.0420	37.0000	0.2400	8.8800	58.4800	2163.7600 (29a)
Lift	5.0980		5.0980	0.2400	1.2235	58.4800	298.1310 (29a)
Wl - Dormer	0.5680		0.5680	0.4400	0.2499	9.0000	5.1120 (29a)
Rf - Ins Joist	64.5840		64.5840	0.1000	6.4584	7.4000	477.9216 (30)
Rf - Ins Rafter	6.4460		6.4460	0.1800	1.1603	5.6000	36.0976 (30)
Flat over Dormer	1.2090		1.2090	0.3300	0.3990	9.0000	10.8810 (30)
Total net area of external elements Aum(A, m ²)			144.4100				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		38.8454		(33)
Party Wall			14.4670	0.0000	0.0000	7.4000	107.0558 (32)
Party Floor			70.3700			20.1600	1418.6592 (32d)
Heat capacity Cm = Sum(A x k)			(28)...(30) + (32) + (32a)...(32e) =				5500.9594 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							78.1719 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.1114 (36)
Total fabric heat loss						(33) + (36) =	45.9568 (37)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF HEAT DEMAND 09 Jan 2014

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	36.7079	35.5754	34.9458	34.1645	34.3536	33.6221	33.7987	33.6221	34.1645	34.9458	34.9458	35.5754	(38)
Heat transfer coeff	82.6647	81.5322	80.9025	80.1212	80.3103	79.5789	79.7555	79.5789	80.1212	80.9025	80.9025	81.5322	(39)
Average = Sum(39)m / 12 =												80.6585	(39)
HLP	1.1747	1.1586	1.1497	1.1386	1.1413	1.1309	1.1334	1.1309	1.1386	1.1497	1.1497	1.1586	(40)
HLP (average)												1.1462	(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													2.2551	(42)	
Average daily hot water use (litres/day)													87.7580	(43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Daily hot water use	96.5338	93.0235	89.5132	86.0028	82.4925	78.9822	78.9822	82.4925	86.0028	89.5132	93.0235	96.5338	(44)		
Energy content (annual)	143.1569	125.2059	129.2013	112.6408	108.0815	93.2661	86.4248	99.1737	100.3582	116.9578	127.6685	138.6398	(45)		
Distribution loss (46)m = 0.15 x (45)m	21.4735	18.7809	19.3802	16.8961	16.2122	13.9899	12.9637	14.8761	15.0537	17.5437	19.1503	20.7960	(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	16.2035	14.6003	16.1088	15.5260	15.9975	15.4285	15.9098	15.9667	15.4816	16.0628	15.6179	16.1852	(61)		
Total heat required for water heating calculated for each month	159.3603	139.8062	145.3101	128.1668	124.0791	108.6946	102.3346	115.1404	115.8398	133.0205	143.2864	154.8249	(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	159.3603	139.8062	145.3101	128.1668	124.0791	108.6946	102.3346	115.1404	115.8398	133.0205	143.2864	154.8249	(64)		
								Total per year (kWh/year) = Sum(64)m =						1569.8637	(64)
RHI water heating demand												1570	(64)		
Heat gains from water heating, kWh/month	51.6505	45.2810	46.9866	41.3346	39.9365	34.8681	32.7137	36.9669	37.2395	42.9041	46.3543	50.1440	(65)		

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

Metabolic gains (Table 5), Watts													
(66)m	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	46.4307	41.2393	33.5381	25.3905	18.9797	16.0235	17.3139	22.5053	30.2065	38.3541	44.7649	47.7212	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	295.7598	298.8289	291.0949	274.6303	253.8467	234.3130	221.2633	218.1942	225.9281	242.3928	263.1764	282.7101	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	(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)	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	(71)
Water heating gains (Table 5)	69.4227	67.3825	63.1541	57.4091	53.6781	48.4279	43.9700	49.6867	51.7215	57.6669	64.3809	67.3979	(72)
Total internal gains	510.5003	506.3377	486.6741	456.3169	425.3914	397.6514	381.4342	389.2732	406.7432	437.3008	471.2093	496.7161	(73)

6. Solar gains

[Jan]														
	Area m2				Solar flux Table 6a W/m2		Specific data or Table 6b		Specific data or Table 6c		Access factor Table 6d		Gains W	
North	7.9960				13.4530		0.7300		0.7200		0.7700		39.1816	
South	2.5420				56.4170		0.7300		0.7200		0.7700		52.2365 (78)	
Solar gains	91.4181	139.3734	208.9719	304.1644	362.7147	407.0274	377.0403	322.7907	251.1008	169.8346	110.0018	76.4182 (83)		
Total gains	601.9184	645.7112	695.6460	760.4813	788.1062	804.6788	758.4745	712.0639	657.8440	607.1354	581.2111	573.1343 (84)		

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
tau	18.4849	18.7416	18.8875	19.0717	19.0268	19.2016	19.1591	19.2016	19.0717	18.8875	18.8875	18.7416
alpha	2.2323	2.2494	2.2592	2.2714	2.2685	2.2801	2.2773	2.2801	2.2714	2.2592	2.2592	2.2494
util living area	0.8936	0.8770	0.8371	0.7578	0.6386	0.4852	0.3765	0.3706	0.5741	0.7534	0.8525	0.8990 (86)
MIT	18.8246	18.9924	19.4151	19.9868	20.4975	20.8139	20.9251	20.9334	20.7210	20.2087	19.5161	18.8436 (87)
Th 2	19.9403	19.9532	19.9605	19.9695	19.9673	19.9757	19.9737	19.9757	19.9695	19.9605	19.9605	19.9532 (88)
util rest of house	0.8806	0.8624	0.8173	0.7276	0.5902	0.4159	0.2881	0.2757	0.5031	0.7133	0.8316	0.8864 (89)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF HEAT DEMAND 09 Jan 2014

MIT 2	17.9958	18.1668	18.5812	19.1312	19.5962	19.8654	19.9422	19.9501	19.7957	19.3440	18.6869	18.0245 (90)
Living area fraction									fLA = Living area / (4) =			0.4233 (91)
MIT	18.3466	18.5163	18.9342	19.4934	19.9777	20.2669	20.3583	20.3664	20.1874	19.7100	19.0379	18.3713 (92)
Temperature adjustment												-0.1500
adjusted MIT	18.1966	18.3663	18.7842	19.3434	19.8277	20.1169	20.2083	20.2164	20.0374	19.5600	18.8879	18.2213 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8540	0.8354	0.7910	0.7069	0.5831	0.4260	0.3092	0.2989	0.5082	0.6957	0.8057	0.8604 (94)	
Useful gains	514.0342	539.4396	550.2257	537.5528	459.5250	342.7575	234.4849	212.8641	334.3094	422.3981	468.2611	493.1193 (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													
	1057.8288	1040.8607	945.2843	788.6683	580.4599	383.3268	247.9028	224.1248	395.5925	611.6260	832.3157	1029.0391 (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													
	404.5832	336.9550	293.9236	180.8031	89.9756	0.0000	0.0000	0.0000	0.0000	140.7856	262.1193	398.7243 (98)	
Space heating													
RHI space heating demand													2107.8696 (98)
													2108 (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	70.3700 (1b)	x 2.5800 (2b)	= 181.5546 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.3700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 181.5546 (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 20.0000 / (5) = 0.1102 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3602 (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) =				0.3331 (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	0.4248	0.4164	0.4081	0.3665	0.3581	0.3165	0.3165	0.3082	0.3331	0.3581	0.3748	0.3914 (22b)
Effective ac	0.5902	0.5867	0.5833	0.5671	0.5641	0.5501	0.5501	0.5475	0.5555	0.5641	0.5702	0.5766 (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)			10.5400	1.3258	13.9735		(27)
Corridor	6.8830	2.1460	4.7370	0.2147	1.0170	58.4800	277.0198 (29a)
Brick High Strength	15.5740	3.4960	12.0780	0.2600	3.1403	58.4800	706.3214 (29a)
Clad High Strength	44.0420	7.0420	37.0000	0.2400	8.8800	58.4800	2163.7600 (29a)
Lift	5.0980		5.0980	0.2400	1.2235	58.4800	298.1310 (29a)
Wl - Dormer	0.5680		0.5680	0.4400	0.2499	9.0000	5.1120 (29a)
Rf - Ins Joist	64.5840		64.5840	0.1000	6.4584	7.4000	477.9216 (30)
Rf - Ins Rafter	6.4460		6.4460	0.1800	1.1603	5.6000	36.0976 (30)
Flat over Dormer	1.2090		1.2090	0.3300	0.3990	9.0000	10.8810 (30)
Total net area of external elements Aum(A, m ²)			144.4100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	38.8454		(33)
Party Wall			14.4670	0.0000	0.0000	7.4000	107.0558 (32)
Party Floor			70.3700			20.1600	1418.6592 (32d)
Heat capacity Cm = Sum(A x k)				(28)...(30) + (32) + (32a)...(32e) =			5500.9594 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							78.1719 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.1114 (36)
Total fabric heat loss						(33) + (36) =	45.9568 (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	35.3614	35.1515	34.9458	33.9795	33.7987	32.9571	32.9571	32.8013	33.2813	33.7987	34.1645	34.5468 (38)
Heat transfer coeff	81.3181	81.1083	80.9025	79.9363	79.7555	78.9139	78.9139	78.7580	79.2381	79.7555	80.1212	80.5036 (39)
Average = Sum(39)m / 12 =												79.9354 (39)
HLP	1.1556	1.1526	1.1497	1.1359	1.1334	1.1214	1.1214	1.1192	1.1260	1.1334	1.1386	1.1440 (40)
HLP (average)												1.1359 (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												2.2551 (42)
Average daily hot water use (litres/day)												87.7580 (43)
Daily hot water use	96.5338	93.0235	89.5132	86.0028	82.4925	78.9822	78.9822	82.4925	86.0028	89.5132	93.0235	96.5338 (44)
Energy conte	143.1569	125.2059	129.2013	112.6408	108.0815	93.2661	86.4248	99.1737	100.3582	116.9578	127.6685	138.6398 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

Energy content (annual)	Total = Sum(45)m = 1380.7752 (45)										
Distribution loss (46)m = 0.15 x (45)m											
21.4735	18.7809	19.3802	16.8961	16.2122	13.9899	12.9637	14.8761	15.0537	17.5437	19.1503	20.7960 (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	16.2035	14.6003	16.1088	15.5260	15.9975	15.4285	15.9098	15.9667	15.4816	16.0628	15.6179 (61)
Total heat required for water heating calculated for each month											
159.3603	139.8062	145.3101	128.1668	124.0791	108.6946	102.3346	115.1404	115.8398	133.0205	143.2864	154.8249 (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 (63)
Solar input (sum of months) = Sum(63)m =	0.0000 (63)										
Output from w/h											
159.3603	139.8062	145.3101	128.1668	124.0791	108.6946	102.3346	115.1404	115.8398	133.0205	143.2864	154.8249 (64)
Heat gains from water heating, kWh/month											
51.6505	45.2810	46.9866	41.3346	39.9365	34.8681	32.7137	36.9669	37.2395	42.9041	46.3543	50.1440 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	46.4307	41.2393	33.5381	25.3905	18.9797	16.0235	17.3139	22.5053	30.2065	38.3541	44.7649	47.7212	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	295.7598	298.8289	291.0949	274.6303	253.8467	234.3130	221.2633	218.1942	225.9281	242.3928	263.1764	282.7101	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	(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)	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	(71)
Water heating gains (Table 5)	69.4227	67.3825	63.1541	57.4091	53.6781	48.4279	43.9700	49.6867	51.7215	57.6669	64.3809	67.3979	(72)
Total internal gains	510.5003	506.3377	486.6741	456.3169	425.3914	397.6514	381.4342	389.2732	406.7432	437.3008	471.2093	496.7161	(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			7.9960	10.6334		0.7300		0.7200		0.7700		30.9694 (74)	
South			2.5420	46.7521		0.7300		0.7200		0.7700		43.2877 (78)	
Solar gains	74.2572	130.0783	190.8750	263.6046	323.9664	335.3112	317.5015	269.6750	215.2517	146.9170	89.5155	63.2222	(83)
Total gains	584.7574	636.4161	677.5490	719.9215	749.3578	732.9626	698.9357	658.9482	621.9948	584.2178	560.7248	559.9384	(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	18.7909	18.8396	18.8875	19.1158	19.1591	19.3634	19.3634	19.4018	19.2842	19.1591	19.0717	18.9811
alpha	2.2527	2.2560	2.2592	2.2744	2.2773	2.2909	2.2909	2.2935	2.2856	2.2773	2.2714	2.2654
util living area	0.9088	0.8879	0.8532	0.7892	0.6913	0.5598	0.4409	0.4769	0.6497	0.8051	0.8831	0.9158 (86)
MIT	18.5896	18.8373	19.2609	19.8272	20.3419	20.7200	20.8844	20.8578	20.5791	19.9435	19.1842	18.5401 (87)
Th 2	19.9557	19.9581	19.9605	19.9716	19.9737	19.9834	19.9834	19.9852	19.9796	19.9737	19.9695	19.9651 (88)
util rest of house	0.8982	0.8750	0.8357	0.7626	0.6496	0.4958	0.3548	0.3911	0.5906	0.7752	0.8676	0.9060 (89)
MIT 2	17.7748	18.0181	18.4324	18.9841	19.4645	19.8019	19.9272	19.9123	19.6889	19.1065	18.3705	17.7331 (90)
Living area fraction	18.1198	18.3649	18.7831	19.3410	19.8359	20.1906	20.3324	20.3126	20.0658	19.4608	18.7149	18.0747 (91)
MIT	18.1198	18.3649	18.7831	19.3410	19.8359	20.1906	20.3324	20.3126	20.0658	19.4608	18.7149	18.0747 (92)
Temperature adjustment	17.9698	18.2149	18.6331	19.1910	19.6859	20.0406	20.1824	20.1626	19.9158	19.3108	18.5649	17.9247 (93)
adjusted MIT	17.9698	18.2149	18.6331	19.1910	19.6859	20.0406	20.1824	20.1626	19.9158	19.3108	18.5649	17.9247 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Utilisation	0.8727	0.8483	0.8088	0.7395	0.6367	0.4997	0.3726	0.4071	0.5865	0.7525	0.8415	0.8813	(94)	
Useful gains	510.3468	539.8835	548.0218	532.3485	477.1366	366.2552	260.4026	268.2268	364.8291	439.6378	471.8566	493.4965	(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	1111.5987	1079.9477	981.6020	822.6240	636.9210	429.3355	282.7041	296.3333	460.8296	694.7376	918.5834	1104.8909	(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	447.3315	362.9231	322.5837	208.9983	118.8796	0.0000	0.0000	0.0000	0.0000	189.7943	321.6433	454.8774	(98)	
Space heating												2427.0312	(98)	
Space heating per m2												(98) / (4) =	34.4896	(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													2681.8025 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	447.3315	362.9231	322.5837	208.9983	118.8796	0.0000	0.0000	0.0000	0.0000	189.7943	321.6433	454.8774	(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)	494.2889	401.0200	356.4460	230.9374	131.3587	0.0000	0.0000	0.0000	0.0000	209.7175	355.4070	502.6270	(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	159.3603	139.8062	145.3101	128.1668	124.0791	108.6946	102.3346	115.1404	115.8398	133.0205	143.2864	154.8249	(64)
Efficiency of water heater (217)m	89.6370	89.5868	89.4814	89.2563	88.8370	87.3000	87.3000	87.3000	87.3000	89.1534	89.4891	87.3000	(216)
Fuel for water heating, kWh/month	177.7842	156.0568	162.3914	143.5941	139.6705	124.5070	117.2217	131.8905	132.6916	149.2041	160.1161	172.6697	(219)
Water heating fuel used												1767.7977	(219)
Annual totals kWh/year													
Space heating fuel - main system												2681.8025	(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)												327.9923	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV Unit 0 (0.80 * 0.30 * 908 * 1.00) =												-646.3922	
PV Unit 1 (0.80 * 0.59 * 908 * 1.00) =												-646.3922	(233)
Total delivered energy for all uses												4206.2003	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2681.8025	3.4800	93.3267	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1767.7977	3.4800	61.5194	(247)
Pumps and fans for heating	75.0000	13.1900	9.8925	(249)
Energy for lighting	327.9923	13.1900	43.2622	(250)
Additional standing charges			120.0000	(251)
Energy saving/generation technologies				
PV Unit	0.0000	0.0000	0.0000	(252)
Total energy cost			328.0008	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200	(256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.1941	(257)
SAP value		83.3427	
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	2681.8025	0.2160	579.2693	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1767.7977	0.2160	381.8443	(264)
Space and water heating			961.1136	(265)
Pumps and fans	75.0000	0.5190	38.9250	(267)
Energy for lighting	327.9923	0.5190	170.2280	(268)
Energy saving/generation technologies				
PV Unit	-646.3922	0.5190	-335.4776	(269)
Total kg/year			834.7891	(272)
CO2 emissions per m2			11.8600	(273)
EI value			90.3041	
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	$0.216 / 0.8869 = 0.2435$, 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	70.3700 (1b)	x 2.5800 (2b)	= 181.5546 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.3700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 181.5546 (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 20.0000 / (5) = 0.1102 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3602 (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) =				0.3331 (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	0.4747	0.4331	0.4081	0.3748	0.3831	0.3498	0.3581	0.3498	0.3748	0.4081	0.4081	0.4331 (22b)
Effective ac	0.6127	0.5938	0.5833	0.5702	0.5734	0.5612	0.5641	0.5612	0.5702	0.5833	0.5833	0.5938 (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)			10.5400	1.3258	13.9735		(27)
Corridor	6.8830	2.1460	4.7370	0.2147	1.0170	58.4800	277.0198 (29a)
Brick High Strength	15.5740	3.4960	12.0780	0.2600	3.1403	58.4800	706.3214 (29a)
Clad High Strength	44.0420	7.0420	37.0000	0.2400	8.8800	58.4800	2163.7600 (29a)
Lift	5.0980		5.0980	0.2400	1.2235	58.4800	298.1310 (29a)
Wl - Dormer	0.5680		0.5680	0.4400	0.2499	9.0000	5.1120 (29a)
Rf - Ins Joist	64.5840		64.5840	0.1000	6.4584	7.4000	477.9216 (30)
Rf - Ins Rafter	6.4460		6.4460	0.1800	1.1603	5.6000	36.0976 (30)
Flat over Dormer	1.2090		1.2090	0.3300	0.3990	9.0000	10.8810 (30)
Total net area of external elements Aum(A, m ²)			144.4100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	38.8454		(33)
Party Wall			14.4670	0.0000	0.0000	7.4000	107.0558 (32)
Party Floor			70.3700			20.1600	1418.6592 (32d)

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
(28)...(30) + (32) + (32a)...(32e) = 5500.9594 (34)
78.1719 (35)
7.1114 (36)
(33) + (36) = 45.9568 (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	36.7079	35.5754	34.9458	34.1645	34.3536	33.6221	33.7987	33.6221	34.1645	34.9458	34.9458	35.5754 (38)
Heat transfer coeff	82.6647	81.5322	80.9025	80.1212	80.3103	79.5789	79.7555	79.5789	80.1212	80.9025	80.9025	81.5322 (39)
Average = Sum(39)m / 12 =												80.6585 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.1747	1.1586	1.1497	1.1386	1.1413	1.1309	1.1334	1.1309	1.1386	1.1497	1.1497	1.1586 (40)
HLP (average)												1.1462 (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												2.2551 (42)
Average daily hot water use (litres/day)												87.7580 (43)
Daily hot water use	96.5338	93.0235	89.5132	86.0028	82.4925	78.9822	78.9822	82.4925	86.0028	89.5132	93.0235	96.5338 (44)
Energy conte	143.1569	125.2059	129.2013	112.6408	108.0815	93.2661	86.4248	99.1737	100.3582	116.9578	127.6685	138.6398 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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

Energy content (annual)												Total = Sum(45)m =	1380.7752 (45)
Distribution loss (46)m = 0.15 x (45)m													
	21.4735	18.7809	19.3802	16.8961	16.2122	13.9899	12.9637	14.8761	15.0537	17.5437	19.1503	20.7960 (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	16.2035	14.6003	16.1088	15.5260	15.9975	15.4285	15.9098	15.9667	15.4816	16.0628	15.6179	16.1852 (61)	
Total heat required for water heating calculated for each month	159.3603	139.8062	145.3101	128.1668	124.0791	108.6946	102.3346	115.1404	115.8398	133.0205	143.2864	154.8249 (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	159.3603	139.8062	145.3101	128.1668	124.0791	108.6946	102.3346	115.1404	115.8398	133.0205	143.2864	154.8249 (64)	
								Total per year (kWh/year) = Sum(64)m =					1569.8637 (64)
Heat gains from water heating, kWh/month	51.6505	45.2810	46.9866	41.3346	39.9365	34.8681	32.7137	36.9669	37.2395	42.9041	46.3543	50.1440 (65)	

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	135.3044	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	46.4307	41.2393	33.5381	25.3905	18.9797	16.0235	17.3139	22.5053	30.2065	38.3541	44.7649	47.7212	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	295.7598	298.8289	291.0949	274.6303	253.8467	234.3130	221.2633	218.1942	225.9281	242.3928	263.1764	282.7101	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	50.7855	(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)	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	-90.2030	(71)
Water heating gains (Table 5)	69.4227	67.3825	63.1541	57.4091	53.6781	48.4279	43.9700	49.6867	51.7215	57.6669	64.3809	67.3979	(72)
Total internal gains	510.5003	506.3377	486.6741	456.3169	425.3914	397.6514	381.4342	389.2732	406.7432	437.3008	471.2093	496.7161	(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				7.9960	13.4530		0.7300	0.7200				0.7700	39.1816
South				2.5420	56.4170		0.7300	0.7200				0.7700	52.2365 (78)
Solar gains	91.4181	139.3734	208.9719	304.1644	362.7147	407.0274	377.0403	322.7907	251.1008	169.8346	110.0018		76.4182 (83)
Total gains	601.9184	645.7112	695.6460	760.4813	788.1062	804.6788	758.4745	712.0639	657.8440	607.1354	581.2111		573.1343 (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	18.4849	18.7416	18.8875	19.0717	19.0268	19.2016	19.1591	19.2016	19.0717	18.8875	18.8875	18.7416
alpha	2.2323	2.2494	2.2592	2.2714	2.2685	2.2801	2.2773	2.2801	2.2714	2.2592	2.2592	2.2494
util living area	0.8936	0.8770	0.8371	0.7578	0.6386	0.4852	0.3765	0.3706	0.5741	0.7534	0.8525	0.8990 (86)
MIT	18.8246	18.9924	19.4151	19.9868	20.4975	20.8139	20.9251	20.9334	20.7210	20.2087	19.5161	18.8436 (87)
Th 2	19.9403	19.9532	19.9605	19.9695	19.9673	19.9757	19.9737	19.9757	19.9695	19.9605	19.9605	19.9532 (88)
util rest of house	0.8806	0.8624	0.8173	0.7276	0.5902	0.4159	0.2881	0.2757	0.5031	0.7133	0.8316	0.8864 (89)
MIT 2	17.9958	18.1668	18.5812	19.1312	19.5962	19.8654	19.9422	19.9501	19.7957	19.3440	18.6869	18.0245 (90)
Living area fraction	18.3466	18.5163	18.9342	19.4934	19.9777	20.2669	20.3583	20.3664	20.1874	19.7100	19.0379	18.3713 (91)
MIT	18.3466	18.5163	18.9342	19.4934	19.9777	20.2669	20.3583	20.3664	20.1874	19.7100	19.0379	18.3713 (92)
Temperature adjustment	18.1966	18.3663	18.7842	19.3434	19.8277	20.1169	20.2083	20.2164	20.0374	19.5600	18.8879	-0.1500
adjusted MIT	18.1966	18.3663	18.7842	19.3434	19.8277	20.1169	20.2083	20.2164	20.0374	19.5600	18.8879	18.2213 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	0.8540	0.8354	0.7910	0.7069	0.5831	0.4260	0.3092	0.2989	0.5082	0.6957	0.8057	0.8604	(94)
Useful gains	514.0342	539.4396	550.2257	537.5528	459.5250	342.7575	234.4849	212.8641	334.3094	422.3981	468.2611	493.1193	(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	1057.8288	1040.8607	945.2843	788.6683	580.4599	383.3268	247.9028	224.1248	395.5925	611.6260	832.3157	1029.0391	(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	404.5832	336.9550	293.9236	180.8031	89.9756	0.0000	0.0000	0.0000	0.0000	140.7856	262.1193	398.7243	(98)
Space heating												2107.8696	(98)
Space heating per m2												(98) / (4) =	29.9541 (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													2329.1377 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	404.5832	336.9550	293.9236	180.8031	89.9756	0.0000	0.0000	0.0000	0.0000	140.7856	262.1193	398.7243	(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)	447.0532	372.3259	324.7774	199.7824	99.4205	0.0000	0.0000	0.0000	0.0000	155.5642	289.6346	440.5794	(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	159.3603	139.8062	145.3101	128.1668	124.0791	108.6946	102.3346	115.1404	115.8398	133.0205	143.2864	154.8249	(64)
Efficiency of water heater (217)m	89.5722	89.5376	89.4157	89.1445	88.6171	87.3000	87.3000	87.3000	87.3000	88.9166	89.3425	87.3000	(216)
Fuel for water heating, kWh/month	177.9127	156.1425	162.5107	143.7741	140.0171	124.5070	117.2217	131.8905	132.6916	149.6015	160.3788	172.8312	(219)
Water heating fuel used												1769.4794	(219)
Annual totals kWh/year													
Space heating fuel - main system												2329.1377	(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)												327.9923	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV Unit 0 (0.80 * 0.30 * 1074 * 1.00) =												-764.8873	
PV Unit 1 (0.80 * 0.59 * 1074 * 1.00) =												-764.8873	(233)
Total delivered energy for all uses												3736.7221	(238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2329.1377	7.6100	177.2474	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1769.4794	7.6100	134.6574	(247)
Pumps and fans for heating	75.0000	31.0800	23.3100	(249)
Energy for lighting	327.9923	31.0800	101.9400	(250)
Additional standing charges			105.0000	(251)
Energy saving/generation technologies				
PV Unit	0.0000	0.0000	0.0000	(252)
Total energy cost			542.1548	(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	2329.1377	0.2160	503.0937	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1769.4794	0.2160	382.2075	(264)
Space and water heating			885.3013	(265)
Pumps and fans	75.0000	0.5190	38.9250	(267)
Energy for lighting	327.9923	0.5190	170.2280	(268)
Energy saving/generation technologies				
PV Unit	-764.8873	0.5190	-396.9765	(269)
Total kg/year			697.4778	(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	2329.1377	1.2200	2841.5480	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1769.4794	1.2200	2158.7649	(264)
Space and water heating			5000.3128	(265)
Pumps and fans	75.0000	3.0700	230.2500	(267)
Energy for lighting	327.9923	3.0700	1006.9365	(268)
Energy saving/generation technologies				
PV Unit	-764.8873	3.0700	-2348.2041	(269)
Primary energy kWh/year			3889.2953	(272)
Primary energy kWh/m2/year			55.2692	(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:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			

Total Savings	£0	0.00 kg/m²
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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	£125	£125	£0
Mains gas	£417	£417	£0
Space heating	£306	£306	£0
Water heating	£135	£135	£0
Lighting	£102	£102	£0
Total cost of fuels	£542	£542	£0
Total cost of uses	£543	£543	£0
Delivered energy	53 kWh/m²	53 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.7 tonnes	0.7 tonnes	0.0 tonnes
CO2 emissions per m²	10 kg/m²	10 kg/m²	0 kg/m²
Primary energy	55 kWh/m²	55 kWh/m²	0 kWh/m²

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	400 - PRJ012992				Issued on Date	26/01/2024
Assessment Reference	400			Prop Type Ref	PRJ012992	
Property	Lancing Phase 2, BN15					
SAP Rating	83 B	DER	13.24	TER	19.79	
Environmental	90 B	% DER<TER	33.11			
CO ₂ Emissions (t/year)	0.70	DFEE	45.42	TFEE	54.91	
General Requirements Compliance	Pass	% DFEE<TFEE	17.28			
Assessor Details	Mr. Michael Jukes, Michael Jukes, 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)	19.79	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	13.24	kgCO ₂ /m ²	Pass
	-6.55 (-33.1%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	54.91	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	45.42	kWh/m ² /yr	
	-9.5 (-17.3%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.24 (max. 0.30)	0.44 (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

8.00 m², No overhang

Windows facing South

2.54 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

0.89

kW