

PREDICTED ENERGY ASSESSMENT



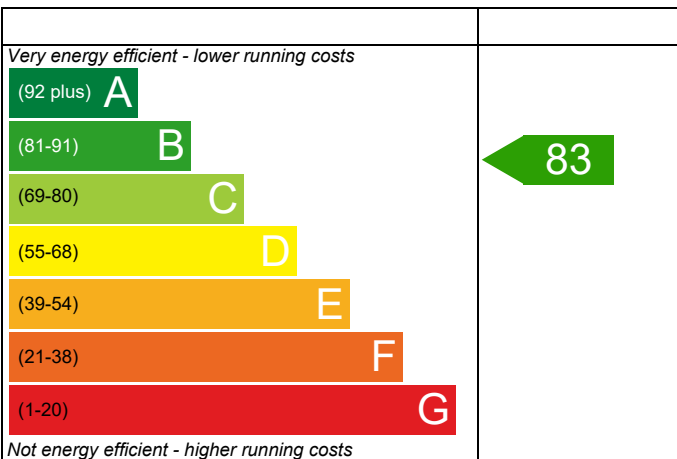
Plot 674

Dwelling type: Flat, Detached
 Date of assessment: 26/02/2021
 Produced by: Michael Juckes
 Total floor area: 67.16 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.

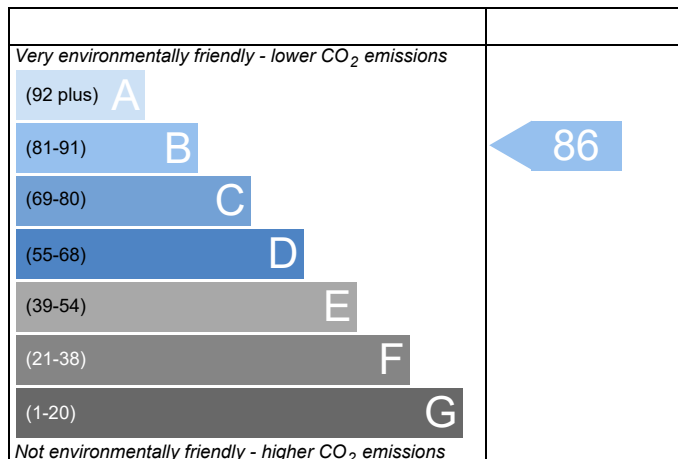
Energy Efficiency Rating



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.

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

BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)



Property Reference	674 - PRJ009149		Issued on Date	26/02/2021	
Assessment Reference	674	Prop Type Ref	Block B		
Property	Plot 674				
SAP Rating	83 B	DER	18.99	TER	19.97
Environmental	86 B	% DER<TER	4.91		
CO ₂ Emissions (t/year)	1.06	DFEE	50.58	TFEE	56.93
General Requirements Compliance	Pass	% DFEE<TFEE	11.15		
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)	19.97	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	18.99	kgCO ₂ /m ²	Pass
	-0.98 (-4.9%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	56.93	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	50.58	kWh/m ² /yr	
	-6.3 (-11.1%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.26 (max. 0.30)	0.26 (max. 0.70)	Pass
Roof	0.11 (max. 0.20)	0.11 (max. 0.35)	Pass
Openings	1.38 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.01 (design value)	m ³ /(h.m ²) @ 50 Pa	
Maximum	10.0	m ³ /(h.m ²) @ 50 Pa	Pass

Limiting System Efficiencies

4 Heating efficiency

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BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)



Main heating system

Boiler system with radiators or underfloor - Mains gas
Data from database
Ideal LOGIC COMBI ESP1 30
Combi boiler
Efficiency: 89.6% SEDBUK2009
Minimum: 88.0%

Pass

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

Continuous extract system (decentralised)

Specific fan power

0.1900 0.1800

Maximum

0.7

Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Southern England)

Slight

Pass

Based on:

Overshading

Average

Windows facing North East

4.71 m², No overhang

Windows facing South West

5.54 m², No overhang

Windows facing North West

5.36 m², No overhang

Air change rate

4.55 ach

Blinds/curtains

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

Criterion 4 – Building performance consistent with DER and DFEE rate

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.01 (design value) m³/(h.m²) @ 50 Pa

Maximum

10.0 m³/(h.m²) @ 50 Pa

Pass

10 Key features

Roof U-value

0.11 W/m²K

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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	674 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	674	Prop Type Ref	Block B
Property	Plot 674		

SAP Rating	83 B	DER	18.99	TER	19.97
Environmental	86 B	% DER<TER	4.91		
CO ₂ Emissions (t/year)	1.06	DFEE	50.58	TTEE	56.93
General Requirements Compliance	Pass	% DFEE<TTEE	11.15		

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	67.1600 (1b)	x 2.4700 (2b)	= 165.8852 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	67.1600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 165.8852 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ 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				0 * 10 =	0.0000 (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	0.0000 / (5) = 0.0000 (8)								
Pressure test				Yes									
Measured/design AP50				5.0100									
Infiltration rate				0.2505	(18)								
Number of sides sheltered				0	(19)								
Shelter factor			(20) = 1 - [0.075 x (19)] =		1.0000 (20)								
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2505 (21)								
Wind speed	Jan 5.1000	Feb 4.7000	Mar 4.6000	Apr 4.3000	May 4.3000	Jun 4.0000	Jul 4.0000	Aug 3.9000	Sep 4.0000	Oct 4.5000	Nov 4.4000	Dec 4.7000	(22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750	(22a)
Adj infilt rate	0.3194	0.2943	0.2881	0.2693	0.2693	0.2505	0.2505	0.2442	0.2505	0.2818	0.2756	0.2943	(22b)
Mechanical extract ventilation - decentralised													0.5000 (23a)
If mechanical ventilation:													
Effective ac	0.5694	0.5443	0.5381	0.5193	0.5193	0.5005	0.5005	0.5000	0.5005	0.5318	0.5256	0.5443	(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
Windows (Uw = 1.40)			15.6100	1.3258	20.6951		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
W1 - Brick	64.9720	15.6090	49.3630	0.2600	12.8344	58.7400	2899.5826 (29a)
W1 - To Corridor	27.4900	2.1170	25.3730	0.2499	6.3410	106.6200	2705.2693 (29a)
RF - Ins Joist	67.1550		67.1550	0.1100	7.3871	5.8200	390.8421 (30)
Total net area of external elements Aum(A, m ²)			159.6210				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 49.8015		(33)
Party Floor			67.1550			40.0000	2686.2000 (32d)
1st Floor Stud			130.0406			5.8200	756.8361 (32c)
Heat capacity Cm = Sum (A x k)							(28)...(30) + (32) + (32a)...(32e) = 9438.7300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							140.5409 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.6729 (36)
Total fabric heat loss							(33) + (36) = 57.4744 (37)

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

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	31.1695	29.7982	29.4554	28.4269	28.4269	27.3984	27.3984	27.3711	27.3984	29.1125	28.7697	29.7982 (38)
Heat transfer coeff	88.6438	87.2726	86.9297	85.9013	85.9013	84.8728	84.8728	84.8454	84.8728	86.5869	86.2441	87.2726 (39)
Average = Sum(39)m / 12 =												86.1847 (39)
HLP	1.3199	1.2995	1.2944	1.2791	1.2791	1.2637	1.2637	1.2633	1.2637	1.2893	1.2842	1.2995 (40)
HLP (average)												1.2833 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.1753 (42)
Average daily hot water use (litres/day)												85.8622 (43)
Daily hot water use	94.4485	91.0140	87.5795	84.1450	80.7105	77.2760	77.2760	80.7105	84.1450	87.5795	91.0140	94.4485 (44)
Energy conte	140.0643	122.5012	126.4102	110.2075	105.7467	91.2514	84.5578	97.0313	98.1902	114.4312	124.9106	135.6448 (45)
Energy content (annual)												Total = Sum(45)m = 1350.9473 (45)
Distribution loss (46)m = 0.15 x (45)m	21.0096	18.3752	18.9615	16.5311	15.8620	13.6877	12.6837	14.5547	14.7285	17.1647	18.7366	20.3467 (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	14.6138	13.1756	14.5490	14.0365	14.4730	13.9698	14.4129	14.4519	14.0062	14.5176	14.0994	14.6013 (61)
Total heat required for water heating calculated for each month	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461 (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	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461 (64)
Total per year (kWh/year) = Sum(64)m =												1521.8541 (64)
RHI water heating demand												1522 (64)
Heat gains from water heating, kWh/month	50.2248	44.0255	45.6687	40.1531	38.7790	33.8335	31.7187	35.8759	36.1498	41.6778	45.0576	48.7522 (65)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metabolic gains (Table 5), Watts	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	42.4759	37.7267	30.6814	23.2278	17.3631	14.6586	15.8392	20.5883	27.6336	35.0872	40.9520	43.6564 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	284.4478	287.3995	279.9614	264.1265	244.1378	225.3512	212.8006	209.8489	217.2870	233.1219	253.1107	271.8973 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268 (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)	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101 (71)
Water heating gains (Table 5)	67.5065	65.5142	61.3826	55.7682	52.1223	46.9910	42.6327	48.2203	50.2080	56.0185	62.5800	65.5272 (72)
Total internal gains	491.1620	487.3722	468.7572	439.8543	410.3550	383.7326	368.0042	375.3893	391.8605	420.9595	453.3745	477.8126 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b	g Specific data or Table 6c	FF Specific data or Table 6c	Access factor Table 6d	Gains W					
Northeast	4.7080	15.0428	0.5000	0.5000	0.0000	0.7700	27.2663 (75)					
Southwest	5.5390	46.3896	0.5000	0.5000	0.0000	0.7700	98.9265 (79)					
Northwest	5.3620	15.0428	0.5000	0.5000	0.0000	0.7700	31.0540 (81)					
Solar gains	157.2468	246.0677	379.8916	555.1568	659.0194	738.5397	682.6458	589.2069	462.8567	300.5724	190.2510	126.2362 (83)
Total gains	648.4089	733.4399	848.6488	995.0111	1069.3743	1122.2723	1050.6500	964.5962	854.7172	721.5319	643.6255	604.0488 (84)

7. Mean internal temperature (heating season)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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	29.5776	30.0423	30.1608	30.5219	30.5219	30.8918	30.8918	30.9017	30.8918	30.2802	30.4006	30.0423
alpha	2.9718	3.0028	3.0107	3.0348	3.0348	3.0595	3.0595	3.0601	3.0595	3.0187	3.0267	3.0028
util living area	0.9412	0.9180	0.8606	0.7461	0.5912	0.4053	0.2936	0.3183	0.5395	0.7870	0.9049	0.9488 (86)
MIT	19.4224	19.6408	20.0530	20.5110	20.8154	20.9577	20.9886	20.9857	20.9003	20.5291	19.9605	19.3994 (87)
Th 2	19.8253	19.8412	19.8452	19.8573	19.8573	19.8693	19.8693	19.8697	19.8693	19.8493	19.8533	19.8412 (88)
util rest of house	0.9298	0.9029	0.8356	0.7047	0.5297	0.3298	0.2062	0.2242	0.4550	0.7380	0.8840	0.9386 (89)
MIT 2	18.4452	18.6670	19.0611	19.4859	19.7396	19.8503	19.8664	19.8660	19.8188	19.5107	18.9899	18.4356 (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) =	0.2799 (91)	
MIT	18.7187	18.9396	19.3388	19.7729	20.0407	20.1603	20.1805	20.1794	20.1215	19.7957	19.2616	18.7054 (92)
Temperature adjustment												-0.1500
adjusted MIT	18.5687	18.7896	19.1888	19.6229	19.8907	20.0103	20.0305	20.0294	19.9715	19.6457	19.1116	18.5554 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9142	0.8860	0.8191	0.6954	0.5316	0.3395	0.2189	0.2378	0.4631	0.7281	0.8675	0.9241 (94)
Useful gains	592.8025	649.8584	695.1379	691.9123	568.4395	380.9980	229.9733	229.3363	395.8124	525.3422	558.3435	558.2207 (95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000 (96)
Heat loss rate W												
Month fracti	1167.3281	1142.3616	1033.4880	860.9760	626.2842	391.2868	231.7491	231.5781	421.9489	679.3380	923.8117	1139.3790 (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	427.4470	330.9621	251.7325	121.7259	43.0365	0.0000	0.0000	0.0000	0.0000	114.5728	263.1371	432.3818 (98)
RHI space heating demand												1984.9957 (98)
												1985 (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	67.1600 (1b)	x 2.4700 (2b)	= 165.8852 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	67.1600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 165.8852 (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				0 * 10 =	0.0000 (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) =				0.0000 / (5) =	0.0000 (8)
Pressure test				Yes	
Measured/design AP50				5.0100	
Infiltration rate				0.2505	(18)
Number of sides sheltered				0	(19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		1.0000 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2505 (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	0.3194	0.3131	0.3069	0.2756	0.2693	0.2380	0.2380	0.2317	0.2505	0.2693	0.2818	0.2943 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5694	0.5631	0.5569	0.5256	0.5193	0.5000	0.5000	0.5000	0.5005	0.5193	0.5318	0.5443 (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
Windows (Uw = 1.40)			15.6100	1.3258	20.6951		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Brick	64.9720	15.6090	49.3630	0.2600	12.8344	58.7400	2899.5826 (29a)
Wl - To Corridor	27.4900	2.1170	25.3730	0.2499	6.3410	106.6200	2705.2693 (29a)
Rf - Ins Joist	67.1550		67.1550	0.1100	7.3871	5.8200	390.8421 (30)
Total net area of external elements Aum(A, m ²)			159.6210				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	49.8015	(33)
Party Floor			67.1550			40.0000	2686.2000 (32d)
1st Floor Stud			130.0406			5.8200	756.8361 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		9438.7300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							140.5409 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.6729 (36)
Total fabric heat loss						(33) + (36) =	57.4744 (37)

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	31.1695	30.8267	30.4838	28.7697	28.4269	27.3711	27.3711	27.3711	27.3984	28.4269	29.1125	29.7982 (38)
Average = Sum(39)m / 12 =	88.6438	88.3010	87.9582	86.2441	85.9013	84.8454	84.8454	84.8454	84.8728	85.9013	86.5869	87.2726 (39)
HLP	1.3199	1.3148	1.3097	1.2842	1.2791	1.2633	1.2633	1.2633	1.2637	1.2791	1.2893	1.2995 (40)
HLP (average)												1.2858 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.1753 (42)
Average daily hot water use (litres/day)												85.8622 (43)
Daily hot water use	94.4485	91.0140	87.5795	84.1450	80.7105	77.2760	77.2760	80.7105	84.1450	87.5795	91.0140	94.4485 (44)
Energy conte	140.0643	122.5012	126.4102	110.2075	105.7467	91.2514	84.5578	97.0313	98.1902	114.4312	124.9106	135.6448 (45)
Energy content (annual)												Total = Sum(45)m = 1350.9473 (45)
Distribution loss (46)m = 0.15 x (45)m												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

Water storage loss:	21.0096	18.3752	18.9615	16.5311	15.8620	13.6877	12.6837	14.5547	14.7285	17.1647	18.7366	20.3467 (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	14.6138	13.1756	14.5490	14.0365	14.4730	13.9698	14.4129	14.4519	14.0062	14.5176	14.0994	14.6013 (61)
Total heat required for water heating calculated for each month	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461 (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	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461 (64)
Heat gains from water heating, kWh/month	50.2248	44.0255	45.6687	40.1531	38.7790	33.8335	31.7187	35.8759	36.1498	41.6778	45.0576	48.7522 (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	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	42.4759	37.7267	30.6814	23.2278	17.3631	14.6586	15.8392	20.5883	27.6336	35.0872	40.9520	43.6564 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	284.4478	287.3995	279.9614	264.1265	244.1378	225.3512	212.8006	209.8489	217.2870	233.1219	253.1107	271.8973 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268 (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)	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101 (71)
Water heating gains (Table 5)	67.5065	65.5142	61.3826	55.7682	52.1223	46.9910	42.6327	48.2203	50.2080	56.0185	62.5800	65.5272 (72)
Total internal gains	491.1620	487.3722	468.7572	439.8543	410.3550	383.7326	368.0042	375.3893	391.8605	420.9595	453.3745	477.8126 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b g	Specific data or Table 6c FF	Access factor Table 6d	Gains W						
Northeast	4.7080	11.2829	0.5000	0.0000	0.7700	20.4512 (75)						
Southwest	5.5390	36.7938	0.5000	0.0000	0.7700	78.4634 (79)						
Northwest	5.3620	11.2829	0.5000	0.0000	0.7700	23.2922 (81)						
Solar gains	122.2068	222.6932	343.2922	490.0447	607.9360	629.5117	596.1081	504.1853	393.4867	256.5293	149.0216	102.8714 (83)
Total gains	613.3688	710.0654	812.0495	929.8990	1018.2910	1013.2443	964.1123	879.5746	785.3472	677.4887	602.3961	580.6840 (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	29.5776	29.6924	29.8081	30.4006	30.5219	30.9017	30.9017	30.9017	30.8918	30.5219	30.2802	30.0423
alpha	2.9718	2.9795	2.9872	3.0267	3.0348	3.0601	3.0601	3.0601	3.0595	3.0348	3.0187	3.0028
util living area	0.9560	0.9325	0.8870	0.7932	0.6549	0.4959	0.3739	0.4224	0.6347	0.8448	0.9341	0.9616 (86)
MIT	19.1745	19.4469	19.8634	20.3692	20.7275	20.9159	20.9734	20.9611	20.8193	20.3372	19.6806	19.1362 (87)
Th 2	19.8253	19.8293	19.8333	19.8533	19.8573	19.8697	19.8697	19.8697	19.8693	19.8573	19.8493	19.8412 (88)
util rest of house	0.9477	0.9202	0.8666	0.7575	0.5995	0.4203	0.2832	0.3268	0.5586	0.8088	0.9200	0.9544 (89)
MIT 2	18.2020	18.4697	18.8729	19.3580	19.6709	19.8257	19.8606	19.8552	19.7638	19.3468	18.7175	18.1764 (90)
Living area fraction	0.9477	0.9202	0.8666	0.7575	0.5995	0.4203	0.2832	0.3268	0.5586	0.8088	0.9200	0.9544 (91)
MIT	18.4742	18.7433	19.1501	19.6411	19.9667	20.1309	20.1721	20.1648	20.0592	19.6241	18.9871	18.4451 (92)
Temperature adjustment	18.3242	18.5933	19.0001	19.4911	19.8167	19.9809	20.0221	20.0148	19.9092	19.4741	18.8371	-0.1500
adjusted MIT	18.3242	18.5933	19.0001	19.4911	19.8167	19.9809	20.0221	20.0148	19.9092	19.4741	18.8371	18.2951 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9339	0.9039	0.8492	0.7449	0.5974	0.4281	0.2958	0.3395	0.5616	0.7946	0.9043	0.9417 (94)
Ext temp.	572.8464	641.8577	689.6166	692.6795	608.2973	433.7772	285.1517	298.6391	441.0155	538.3262	544.7543	546.8261 (95)
Heat loss rate W	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)
Month fracti	1243.1624	1209.1309	1099.4899	913.4187	697.2338	456.5431	290.3478	306.7001	493.0465	762.2925	1016.2804	1230.1164 (97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000 (97a)
Space heating	498.7151	381.2075	304.9457	158.9323	66.1688	0.0000	0.0000	0.0000	0.0000	166.6309	339.4988	508.3680 (98)
Space heating per m2												2424.4670 (98)
												(98) / (4) = 36.0999 (99)

8c. Space cooling requirement

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Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

Not applicable

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
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													2678.9691 (211)
Space heating requirement	498.7151	381.2075	304.9457	158.9323	66.1688	0.0000	0.0000	0.0000	0.0000	166.6309	339.4988	508.3680	(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)	551.0664	421.2238	336.9566	175.6158	73.1146	0.0000	0.0000	0.0000	0.0000	184.1226	375.1368	561.7326	(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	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461	(64)
Efficiency of water heater (217)m	89.7215	89.6375	89.4633	89.0676	88.4098	87.3000	87.3000	87.3000	87.3000	89.0756	89.5465	89.7495	(216)
Fuel for water heating, kWh/month	172.3981	151.3615	157.5609	139.4941	135.9801	120.5283	113.3686	127.7012	128.5182	144.7633	155.2378	167.4060	(219)
Water heating fuel used													1714.3181 (219)
Annual totals kWh/year													
Space heating fuel - main system													2678.9691 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans: (MEVDecentralised, Database: total watage = 5.0830, total flow = 21.0000, SFP = 0.2420)													
mechanical ventilation fans (SFP = 0.2420)													48.9856 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													123.9856 (231)
Electricity for lighting (calculated in Appendix L)													300.0549 (232)
Total delivered energy for all uses													4817.3277 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2678.9691	3.4800	93.2281	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1714.3181	3.4800	59.6583	(247)
Mechanical ventilation fans	48.9856	13.1900	6.4612	(249)
Pumps and fans for heating	75.0000	13.1900	9.8925	(249)
Energy for lighting	300.0549	13.1900	39.5772	(250)
Additional standing charges			120.0000	(251)
Total energy cost			328.8173	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200	(256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.2313	(257)
SAP value		82.8233	
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	2678.9691	0.2160	578.6573	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1714.3181	0.2160	370.2927	(264)
Space and water heating			948.9500	(265)
Pumps and fans	123.9856	0.5190	64.3485	(267)
Energy for lighting	300.0549	0.5190	155.7285	(268)
Total kg/year			1169.0271	(272)
CO2 emissions per m2			17.4100	(273)
EI value			86.0334	
EI rating			86	(274)
EI band			B	

Calculation of stars for heating and DHW

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.9050 = 3.845$, 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	$3.48 / 0.8866 = 3.925$, stars = 4
Water heating environmental impact	$0.216 / 0.8866 = 0.2436$, stars = 4

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Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

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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 (m2)	Storey height (m)	Volume (m3)
Ground floor	67.1600 (1b)	x 2.4700 (2b)	= 165.8852 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	67.1600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 165.8852 (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					0 * 10 = 0.0000 (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) =					0.0000 / (5) = 0.0000 (8)
Pressure test					Yes
Measured/design AP50					5.0100
Infiltration rate					0.2505 (18)
Number of sides sheltered					0 (19)
Shelter factor				(20) = 1 - [0.075 x (19)] =	1.0000 (20)
Infiltration rate adjusted to include shelter factor				(21) = (18) x (20) =	0.2505 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	4.7000	4.6000	4.3000	4.3000	4.0000	4.0000	3.9000	4.0000	4.5000	4.4000	4.7000 (22)
Wind factor	1.2750	1.1750	1.1500	1.0750	1.0750	1.0000	1.0000	0.9750	1.0000	1.1250	1.1000	1.1750 (22a)
Adj infiltr rate	0.3194	0.2943	0.2881	0.2693	0.2693	0.2505	0.2505	0.2442	0.2505	0.2818	0.2756	0.2943 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5694	0.5443	0.5381	0.5193	0.5193	0.5005	0.5005	0.5000	0.5005	0.5318	0.5256	0.5443 (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
Windows (Uw = 1.40)			15.6100	1.3258	20.6951		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Brick	64.9720	15.6090	49.3630	0.2600	12.8344	58.7400	2899.5826 (29a)
Wl - To Corridor	27.4900	2.1170	25.3730	0.2499	6.3410	106.6200	2705.2693 (29a)
Rf - Ins Joist	67.1550		67.1550	0.1100	7.3871	5.8200	390.8421 (30)
Total net area of external elements Aum(A, m2)			159.6210				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	49.8015	(33)
Party Floor			67.1550			40.0000	2686.2000 (32d)
1st Floor Stud			130.0406			5.8200	756.8361 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		9438.7300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							140.5409 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							7.6729 (36)
Total fabric heat loss						(33) + (36) =	57.4744 (37)

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	31.1695	29.7982	29.4554	28.4269	28.4269	27.3984	27.3984	27.3711	27.3984	29.1125	28.7697	29.7982 (38)
Average = Sum(39)m / 12 =	88.6438	87.2726	86.9297	85.9013	85.9013	84.8728	84.8728	84.8454	84.8728	86.5869	86.2441	87.2726 (39)
												86.1847 (39)

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.3199	1.2995	1.2944	1.2791	1.2791	1.2637	1.2637	1.2633	1.2637	1.2893	1.2842	1.2995 (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	2.1753 (42)											
Average daily hot water use (litres/day)	85.8622 (43)											
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	94.4485	91.0140	87.5795	84.1450	80.7105	77.2760	77.2760	80.7105	84.1450	87.5795	91.0140	94.4485 (44)
Energy content (annual)	140.0643	122.5012	126.4102	110.2075	105.7467	91.2514	84.5578	97.0313	98.1902	114.4312	124.9106	135.6448 (45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m = 1350.9473 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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

Water storage loss:	21.0096	18.3752	18.9615	16.5311	15.8620	13.6877	12.6837	14.5547	14.7285	17.1647	18.7366	20.3467 (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	14.6138	13.1756	14.5490	14.0365	14.4730	13.9698	14.4129	14.4519	14.0062	14.5176	14.0994	14.6013 (61)
Total heat required for water heating calculated for each month	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461 (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	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461 (64)
Heat gains from water heating, kWh/month	50.2248	44.0255	45.6687	40.1531	38.7790	33.8335	31.7187	35.8759	36.1498	41.6778	45.0576	48.7522 (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	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151	130.5151 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	42.4759	37.7267	30.6814	23.2278	17.3631	14.6586	15.8392	20.5883	27.6336	35.0872	40.9520	43.6564 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	284.4478	287.3995	279.9614	264.1265	244.1378	225.3512	212.8006	209.8489	217.2870	233.1219	253.1107	271.8973 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268	50.2268 (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)	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101	-87.0101 (71)
Water heating gains (Table 5)	67.5065	65.5142	61.3826	55.7682	52.1223	46.9910	42.6327	48.2203	50.2080	56.0185	62.5800	65.5272 (72)
Total internal gains	491.1620	487.3722	468.7572	439.8543	410.3550	383.7326	368.0042	375.3893	391.8605	420.9595	453.3745	477.8126 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data g or Table 6b	Specific data FF or Table 6c	Access factor Table 6d	Gains W						
Northeast	4.7080	15.0428	0.5000	0.0000	0.7700	27.2663 (75)						
Southwest	5.5390	46.3896	0.5000	0.0000	0.7700	98.9265 (79)						
Northwest	5.3620	15.0428	0.5000	0.0000	0.7700	31.0540 (81)						
Solar gains	157.2468	246.0677	379.8916	555.1568	659.0194	738.5397	682.6458	589.2069	462.8567	300.5724	190.2510	126.2362 (83)
Total gains	648.4089	733.4399	848.6488	995.0111	1069.3743	1122.2723	1050.6500	964.5962	854.7172	721.5319	643.6255	604.0488 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation factor for gains for living area, nil,m (see Table 9a)	29.5776	30.0423	30.1608	30.5219	30.5219	30.8918	30.8918	30.9017	30.8918	30.2802	30.4006	30.0423
tau	2.9718	3.0028	3.0107	3.0348	3.0348	3.0595	3.0595	3.0601	3.0595	3.0187	3.0267	3.0028
util living area	0.9412	0.9180	0.8606	0.7461	0.5912	0.4053	0.2936	0.3183	0.5395	0.7870	0.9049	0.9488 (86)
MIT	19.4224	19.6408	20.0530	20.5110	20.8154	20.9577	20.9886	20.9857	20.9003	20.5291	19.9605	19.3994 (87)
Th 2	19.8253	19.8412	19.8452	19.8573	19.8573	19.8693	19.8693	19.8697	19.8693	19.8493	19.8533	19.8412 (88)
util rest of house	0.9298	0.9029	0.8356	0.7047	0.5297	0.3298	0.2062	0.2242	0.4550	0.7380	0.8840	0.9386 (89)
MIT 2	18.4452	18.6670	19.0611	19.4859	19.7396	19.8503	19.8664	19.8660	19.8188	19.5107	18.9899	18.4356 (90)
Living area fraction	18.7187	18.9396	19.3388	19.7729	20.0407	20.1603	20.1805	20.1794	20.1215	19.7957	19.2616	18.7054 (92)
Temperature adjustment	18.5687	18.7896	19.1888	19.6229	19.8907	20.0103	20.0305	20.0294	19.9715	19.6457	19.1116	-0.1500
adjusted MIT	18.5687	18.7896	19.1888	19.6229	19.8907	20.0103	20.0305	20.0294	19.9715	19.6457	19.1116	18.5554 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	592.8025	649.8584	695.1379	691.9123	568.4395	380.9980	229.9733	229.3363	395.8124	525.3422	558.3435	558.2207 (95)
Ext temp.	5.4000	5.7000	7.3000	9.6000	12.6000	15.4000	17.3000	17.3000	15.0000	11.8000	8.4000	5.5000 (96)
Heat loss rate W	1167.3281	1142.3616	1033.4880	860.9760	626.2842	391.2868	231.7491	231.5781	421.9489	679.3380	923.8117	1139.3790 (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	427.4470	330.9621	251.7325	121.7259	43.0365	0.0000	0.0000	0.0000	0.0000	114.5728	263.1371	432.3818 (98)
Space heating per m2												1984.9957 (98)
												(98) / (4) = 29.5562 (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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
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													2193.3655 (211)
Space heating requirement	427.4470	330.9621	251.7325	121.7259	43.0365	0.0000	0.0000	0.0000	0.0000	114.5728	263.1371	432.3818	(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)	472.3172	365.7040	278.1575	134.5037	47.5541	0.0000	0.0000	0.0000	0.0000	126.5998	290.7592	477.7699	(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	154.6781	135.6767	140.9593	124.2440	120.2197	105.2212	98.9708	111.4832	112.1964	128.9488	139.0100	150.2461	(64)
Efficiency of water heater (217)m	89.6271	89.5457	89.3247	88.8548	88.1214	87.3000	87.3000	87.3000	87.3000	88.7769	89.3677	89.6526	(216)
Fuel for water heating, kWh/month	172.5797	151.5168	157.8055	139.8281	136.4251	120.5283	113.3686	127.7012	128.5182	145.2504	155.5484	167.5871	(219)
Water heating fuel used													1716.6573 (219)
Annual totals kWh/year													
Space heating fuel - main system													2193.3655 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans: (MEVDecentralised, Database: total watage = 5.0830, total flow = 21.0000, SFP = 0.2420)													
mechanical ventilation fans (SFP = 0.2420)													48.9856 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													123.9856 (231)
Electricity for lighting (calculated in Appendix L)													300.0549 (232)
Total delivered energy for all uses													4334.0632 (238)

10a. Fuel costs - using BEDF prices (472)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2193.3655	3.8700	84.8832 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1716.6573	3.8700	66.4346 (247)
Mechanical ventilation fans	48.9856	18.9000	9.2583 (249)
Pumps and fans for heating	75.0000	18.9000	14.1750 (249)
Energy for lighting	300.0549	18.9000	56.7104 (250)
Additional standing charges			93.0000 (251)
Total energy cost			324.4615 (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	2193.3655	0.2160	473.7669 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1716.6573	0.2160	370.7980 (264)
Space and water heating			844.5649 (265)
Pumps and fans	123.9856	0.5190	64.3485 (267)
Energy for lighting	300.0549	0.5190	155.7285 (268)
Total kg/year			1064.6419 (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	2193.3655	1.2200	2675.9059 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1716.6573	1.2200	2094.3218 (264)
Space and water heating			4770.2277 (265)
Pumps and fans	123.9856	3.0700	380.6357 (267)
Energy for lighting	300.0549	3.0700	921.1686 (268)
Primary energy kWh/year			6072.0320 (272)
Primary energy kWh/m2/year			90.4114 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 83
 Current environmental impact rating: B 86

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



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
F	Already installed
G	Not considered
H	Not considered
I	Not considered
J	Not considered
K	Not considered
M	Not considered
N	Solar water heating
O	Not applicable
P	Not considered
R	Not considered
S	Not considered
T	Not considered
U	Solar photovoltaic panels
A2	Not applicable
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
L2	Not applicable
Q3	Not considered
O3	Not considered

Recommended measures: (none)	SAP change	Cost change	CO2 change
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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 86

Fuel prices for cost data on this page from database revision number 472 TEST (30 Jan 2021)
 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	£80	£80	£0
Mains gas	£244	£244	£0
Space heating	£201	£201	£0
Water heating	£66	£66	£0
Lighting	£57	£57	£0
Total cost of fuels	£324	£324	£0
Total cost of uses	£324	£324	£0
Delivered energy	65 kWh/m ²	65 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	1.1 tonnes	1.1 tonnes	0.0 tonnes
CO2 emissions per m ²	16 kg/m ²	16 kg/m ²	0 kg/m ²
Primary energy	90 kWh/m ²	90 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	674 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	674	Prop Type Ref	Block B
Property	Plot 674		

SAP Rating	83 B	DER	18.99	TER	19.97
Environmental	86 B	% DER<TER	4.91		
CO₂ Emissions (t/year)	1.06	DFEE	50.58	TFEE	56.93
General Requirements Compliance	Pass	% DFEE<TFEE	11.15		

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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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)	19.97	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	18.99	kgCO ₂ /m ²	Pass
	-0.98 (-4.9%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	56.93	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	50.58	kWh/m ² /yr	
	-6.3 (-11.1%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.26 (max. 0.30)	0.26 (max. 0.70)	Pass
Roof	0.11 (max. 0.20)	0.11 (max. 0.35)	Pass
Openings	1.38 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.01 (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 30 Combi boiler Efficiency: 89.6% SEDBUK2009 Minimum: 88.0%	Pass
Secondary heating system	None	

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



5 Cylinder insulation

Hot water storage

6 Controls

Space heating controls

Hot water controls

Boiler interlock

7 Low energy lights

Percentage of fixed lights with low-energy fittings %

Minimum %

8 Mechanical ventilation

Continuous extract system (decentralised)

Specific fan power

Maximum

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Southern England)

Based on:

Overshading

Windows facing North East

Windows facing South West

Windows facing North West

Air change rate

Blinds/curtains

Criterion 4 – Building performance consistent with DER and DFEE rate

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

Maximum

10 Key features

Roof U-value W/m²K

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