

# PREDICTED ENERGY ASSESSMENT

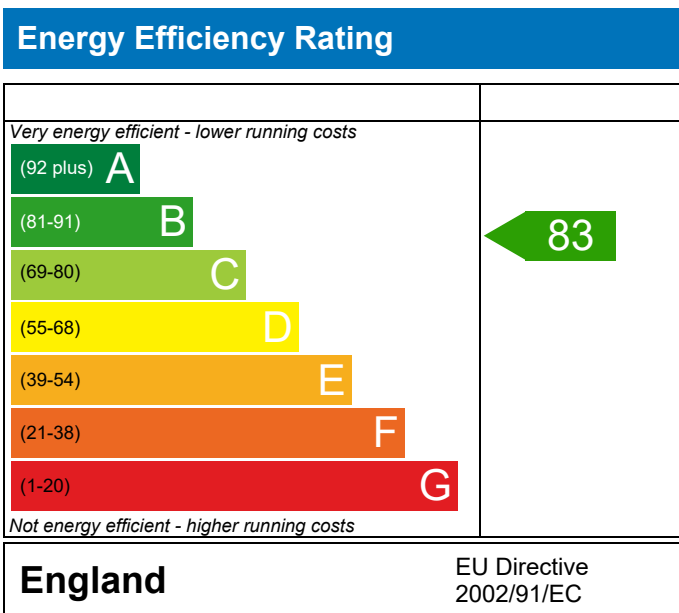


Plot 671

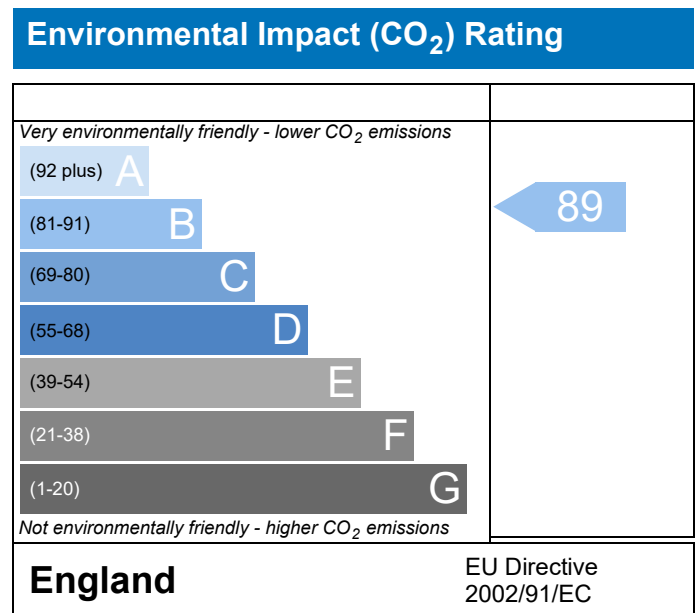
Dwelling type: Flat, End-Terrace  
 Date of assessment: 26/02/2021  
 Produced by: Michael Juckes  
 Total floor area: 44.01 m<sup>2</sup>

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 (CO<sub>2</sub>) emissions.



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.



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO<sub>2</sub>) 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	671 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	671	Prop Type Ref	Block B
Property	Plot 671		

SAP Rating	83 B	DER	18.83	TER	20.44
Environmental	89 B	% DER<TER	7.90		
CO <sub>2</sub> Emissions (t/year)	0.68	DFEE	43.72	TFEE	47.99
General Requirements Compliance	Pass	% DFEE<TFEE	8.90		

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)	20.44	kgCO <sub>2</sub> /m <sup>2</sup>	
Dwelling Carbon Dioxide Emission Rate (DER)	18.83	kgCO <sub>2</sub> /m <sup>2</sup>	Pass
	-1.61 (-7.9%)	kgCO <sub>2</sub> /m <sup>2</sup>	

##### 1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	47.99	kWh/m <sup>2</sup> /yr	
Dwelling Fabric Energy Efficiency (DFEE)	43.72	kWh/m <sup>2</sup> /yr	
	-4.3 (-9.0%)	kWh/m <sup>2</sup> /yr	Pass

#### Criterion 2 – Limits on design flexibility

##### Limiting Fabric Standards

##### 2 Fabric U-values

Element	Average	Highest	
External wall	0.25 (max. 0.30)	0.25 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Openings	1.36 (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 <sup>3</sup> /(h.m <sup>2</sup> ) @ 50 Pa	
Maximum	10.0	m <sup>3</sup> /(h.m <sup>2</sup> ) @ 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

4.85 m<sup>2</sup>, No overhang

Windows facing North West

3.69 m<sup>2</sup>, No overhang

Air change rate

4.21 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/m<sup>2</sup>K

Pass

### Air permeability and pressure testing

#### 3 Air permeability

Air permeability at 50 pascals

5.01 (design value) m<sup>3</sup>/(h.m<sup>2</sup>) @ 50 Pa

Maximum

10.0 m<sup>3</sup>/(h.m<sup>2</sup>) @ 50 Pa

Pass

### 10 Key features

Party wall U-value

0.00

W/m<sup>2</sup>K

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# FULL SAP CALCULATION PRINTOUT

## Calculation Type: New Build (As Designed)



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Assessment Reference	671	Prop Type Ref	Block B
Property	Plot 671		

SAP Rating	83 B	DER	18.83	TER	20.44
Environmental	89 B	% DER<TER	7.90		
CO <sub>2</sub> Emissions (t/year)	0.68	DFEE	43.72	TTEE	47.99
General Requirements Compliance	Pass	% DFEE<TTEE	8.90		

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 <sup>2</sup> )	Storey height (m)	Volume (m <sup>3</sup> )
Ground floor	44.0100 (1b)	2.4600 (2b)	108.2646 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	44.0100		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 108.2646 (5)
Dwelling volume			

#### 2. Ventilation rate

	main heating	secondary heating	other	total	m <sup>3</sup> 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)

	Air changes per hour
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	1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2317 (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	0.2954	0.2723	0.2665	0.2491	0.2491	0.2317	0.2317	0.2259	0.2317	0.2607	0.2549	0.2723 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5454	0.5223	0.5165	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5107	0.5049	0.5223 (25)

#### 3. Heat losses and heat loss parameter

Element	Gross m <sup>2</sup>	Openings m <sup>2</sup>	NetArea m <sup>2</sup>	U-value W/m <sup>2</sup> K	A x U W/K	K-value kJ/m <sup>2</sup> K	A x K kJ/K
Windows (Uw = 1.40)			8.5400	1.3258	11.3220		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
W1 - Clad	34.9590	8.5420	26.4170	0.2500	6.6043	61.0100	1611.7012 (29a)
W1 - To Corridor	13.3600	2.1170	11.2430	0.2499	2.8097	106.6200	1198.7287 (29a)
Total net area of external elements Aum(A, m <sup>2</sup> )			48.3200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	23.2800		(33)
Party Wall			18.2690	0.0000	0.0000	54.0300	987.0741 (32)
Party Floor			44.0060			40.0000	1760.2400 (32d)
Party Ceiling			44.0060			70.0000	3080.4200 (32b)
1st Floor Stud			88.0778			5.8200	512.6130 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		9150.7769 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m <sup>2</sup> K							207.9249 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.5593 (36)
Total fabric heat loss						(33) + (36) =	27.8392 (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	19.4869	18.6590	18.4521	17.8637	17.8637	17.8637	17.8637	17.8637	17.8637	18.2451	18.0381	18.6590 (38)
Heat transfer coeff	47.3261	46.4983	46.2913	45.7029	45.7029	45.7029	45.7029	45.7029	45.7029	46.0843	45.8774	46.4983 (39)
Average = Sum(39)m / 12 =												46.0661 (39)
HLP	1.0753	1.0565	1.0518	1.0385	1.0385	1.0385	1.0385	1.0385	1.0385	1.0471	1.0424	1.0565 (40)
HLP (average)												1.0467 (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												1.5165 (42)
Average daily hot water use (litres/day)												70.2174 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy content (annual)	77.2391	74.4304	71.6217	68.8130	66.0043	63.1956	63.1956	66.0043	68.8130	71.6217	74.4304	77.2391 (44)
Distribution loss (46)m = 0.15 x (45)m	11.4543	10.0180	10.3372	9.01267	8.64787	7.46246	69.1506	79.3514	80.2991	93.5808	102.1508	110.9291 (45)
Total = Sum(45)m =												1104.7928 (45)
Water storage loss:	17.1815	15.0271	15.5066	13.5190	12.9718	11.1937	10.3726	11.9027	12.0449	14.0371	15.3226	16.6394 (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	14.4823	13.0648	14.4390	13.9444	14.3881	13.8998	14.3480	14.3740	13.9241	14.4180	13.9864	14.4740 (61)
Total heat required for water heating calculated for each month	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031 (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	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031 (64)
Total per year (kWh/year) = Sum(64)m =												1274.5357 (64)
RHI water heating demand												1275 (64)
Heat gains from water heating, kWh/month	41.7063	36.5762	37.9827	33.4532	32.3512	28.2876	26.5796	29.9778	30.1805	34.7201	37.4617	40.5024 (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	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	29.6681	26.3510	21.4300	16.2239	12.1276	10.2386	11.0632	14.3803	19.3013	24.5074	28.6037	30.4927 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	196.6178	198.6581	193.5166	182.5711	168.7544	155.7686	147.0933	145.0530	150.1945	161.1400	174.9567	187.9425 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156 (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)	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609 (71)
Water heating gains (Table 5)	56.0568	54.4288	51.0520	46.4628	43.4828	39.2884	35.7253	40.2928	41.9173	46.6668	52.0302	54.4388 (72)
Total internal gains	361.2888	358.3839	344.9447	324.2039	303.3108	284.2416	272.8278	278.6722	290.3591	311.2602	334.5367	351.8200 (73)

#### 6. Solar gains

[Jan]	Area	Solar flux	Specific data	Specific data	Access	Gains						
	m2	Table 6a	g	FF	factor	W						
		W/m2	or Table 6b	or Table 6c	Table 6d							
Northeast	4.8500	15.0428	0.5000	0.0000	0.7700	28.0887 (75)						
Northwest	3.6920	15.0428	0.5000	0.0000	0.7700	21.3822 (81)						
Solar gains	49.4709	86.6468	155.8705	259.8239	331.6626	381.3891	348.7642	285.4949	201.2779	112.2440	61.8174	38.4843 (83)
Total gains	410.7597	445.0307	500.8152	584.0278	634.9734	665.6308	621.5920	564.1671	491.6370	423.5043	396.3541	390.3043 (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	53.7100	54.6662	54.9106	55.6175	55.6175	55.6175	55.6175	55.6175	55.6175	55.1572	55.4060	54.6662
alpha	4.5807	4.6444	4.6607	4.7078	4.7078	4.7078	4.7078	4.7078	4.7078	4.6771	4.6937	4.6444
util living area	0.9686	0.9544	0.9051	0.7747	0.5809	0.3819	0.2716	0.2990	0.5414	0.8243	0.9395	0.9726 (86)
MIT	20.1487	20.2802	20.5453	20.8271	20.9620	20.9956	20.9993	20.9990	20.9797	20.8116	20.4820	20.1435 (87)
Th 2	20.0210	20.0365	20.0404	20.0514	20.0514	20.0514	20.0514	20.0514	20.0514	20.0442	20.0481	20.0365 (88)
util rest of house	0.9606	0.9433	0.8834	0.7332	0.5227	0.3184	0.2022	0.2227	0.4624	0.7764	0.9223	0.9655 (89)
MIT 2	19.2773	19.4168	19.6700	19.9267	20.0296	20.0497	20.0513	20.0512	20.0425	19.9156	19.6229	19.2855 (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) =		0.4199 (91)	
MIT	19.6432	19.7793	20.0376	20.3048	20.4211	20.4469	20.4494	20.4492	20.4360	20.2919	19.9837	19.6458 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.4932	19.6293	19.8876	20.1548	20.2711	20.2969	20.2994	20.2992	20.2860	20.1419	19.8337	19.4958 (93)

#### 8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9553	0.9378	0.8795	0.7380	0.5365	0.3349	0.2204	0.2427	0.4824	0.7818	0.9177	0.9605 (94)
Useful gains	392.4027	417.3296	440.4545	431.0079	340.6747	222.9221	136.9927	136.9378	237.1779	331.0847	363.7430	374.9059 (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	666.9768	647.6897	582.6944	482.3854	350.5930	223.8015	137.0794	137.0707	241.5870	384.4286	524.5461	650.7805 (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	204.2832	154.8020	105.8265	36.9918	7.3792	0.0000	0.0000	0.0000	0.0000	39.6879	115.7782	205.2507 (98)
RHI space heating demand												869.9995 (98)
												870 (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 <sup>2</sup> )	Storey height (m)	Volume (m <sup>3</sup> )
Ground floor	44.0100 (1b)	2.4600 (2b)	108.2646 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	44.0100		108.2646 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 108.2646 (5)

#### 2. Ventilation rate

	main heating	secondary heating	other	total	m <sup>3</sup> 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)	
Air changes per hour						
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					1	(19)
Shelter factor					(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor					(21) = (18) x (20) =	0.2317 (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	0.2954	0.2896	0.2838	0.2549	0.2491	0.2201	0.2201	0.2143	0.2317	0.2491	0.2607	0.2723 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												0.5000 (23a)
Effective ac	0.5454	0.5396	0.5338	0.5049	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5107	0.5223 (25)

#### 3. Heat losses and heat loss parameter

Element	Gross m <sup>2</sup>	Openings m <sup>2</sup>	NetArea m <sup>2</sup>	U-value W/m <sup>2</sup> K	A x U W/K	K-value kJ/m <sup>2</sup> K	A x K kJ/K
Windows (Uw = 1.40)			8.5400	1.3258	11.3220		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Clad	34.9590	8.5420	26.4170	0.2500	6.6043	61.0100	1611.7012 (29a)
Wl - To Corridor	13.3600	2.1170	11.2430	0.2499	2.8097	106.6200	1198.7287 (29a)
Total net area of external elements Aum(A, m <sup>2</sup> )			48.3200				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	23.2800			(33)
Party Wall			18.2690	0.0000	0.0000	54.0300	987.0741 (32)
Party Floor			44.0060			40.0000	1760.2400 (32d)
Party Ceiling			44.0060			70.0000	3080.4200 (32b)
1st Floor Stud			88.0778			5.8200	512.6130 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		9150.7769 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m <sup>2</sup> K							207.9249 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.5593 (36)
Total fabric heat loss					(33) + (36) =		27.8392 (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	19.4869	19.2799	19.0730	18.0381	17.8637	17.8637	17.8637	17.8637	17.8637	17.8637	18.2451	18.6590 (38)
Heat transfer coeff	47.3261	47.1191	46.9122	45.8774	45.7029	45.7029	45.7029	45.7029	45.7029	45.7029	46.0843	46.4983 (39)
Average = Sum(39)m / 12 =												46.1696 (39)
HLP	1.0753	1.0706	1.0659	1.0424	1.0385	1.0385	1.0385	1.0385	1.0385	1.0385	1.0471	1.0565 (40)
HLP (average)												1.0491 (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												1.5165 (42)
Average daily hot water use (litres/day)												70.2174 (43)
Daily hot water use	77.2391	74.4304	71.6217	68.8130	66.0043	63.1956	63.1956	66.0043	68.8130	71.6217	74.4304	77.2391 (44)
Energy conte	114.5434	100.1804	103.3772	90.1267	86.4787	74.6246	69.1506	79.3514	80.2991	93.5808	102.1508	110.9291 (45)
Energy content (annual)												Total = Sum(45)m = 1104.7928 (45)

# FULL SAP CALCULATION PRINTOUT

## Calculation Type: New Build (As Designed)



### CALCULATION OF ENERGY RATINGS 09 Jan 2014

Distribution loss (46)m = 0.15 x (45)m	17.1815	15.0271	15.5066	13.5190	12.9718	11.1937	10.3726	11.9027	12.0449	14.0371	15.3226	16.6394 (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	14.4823	13.0648	14.4390	13.9444	14.3881	13.8998	14.3480	14.3740	13.9241	14.4180	13.9864	14.4740 (61)
Total heat required for water heating calculated for each month	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031 (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	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031 (64)
Heat gains from water heating, kWh/month	41.7063	36.5762	37.9827	33.4532	32.3512	28.2876	26.5796	29.9778	30.1805	34.7201	37.4617	40.5024 (65)
												Solar input (sum of months) = Sum(63)m = 0.0000 (63)
												Total per year (kWh/year) = Sum(64)m = 1274.5357 (64)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	29.6681	26.3510	21.4300	16.2239	12.1276	10.2386	11.0632	14.3803	19.3013	24.5074	28.6037	30.4927 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	196.6178	198.6581	193.5166	182.5711	168.7544	155.7686	147.0933	145.0530	150.1945	161.1400	174.9567	187.9425 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156 (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)	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609 (71)
Water heating gains (Table 5)	56.0568	54.4288	51.0520	46.4628	43.4828	39.2884	35.7253	40.2928	41.9173	46.6668	52.0302	54.4388 (72)
Total internal gains	361.2888	358.3839	344.9447	324.2039	303.3108	284.2416	272.8278	278.6722	290.3591	311.2602	334.5367	351.8200 (73)

#### 6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Northeast	4.8500	11.2829	0.5000	0.0000	0.7700	21.0681 (75)						
Northwest	3.6920	11.2829	0.5000	0.0000	0.7700	16.0378 (81)						
Solar gains	37.1059	75.5301	136.0812	223.4844	300.4068	320.2655	299.6018	238.8460	165.8170	92.3037	46.6888	30.3025 (83)
Total gains	398.3946	433.9140	481.0259	547.6883	603.7177	604.5071	572.4296	517.5183	456.1761	403.5640	381.2255	382.1225 (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	53.7100	53.9459	54.1839	55.4060	55.6175	55.6175	55.6175	55.6175	55.6175	55.6175	55.1572	54.6662
alpha	4.5807	4.5964	4.6123	4.6937	4.7078	4.7078	4.7078	4.7078	4.7078	4.7078	4.6771	4.6444
util living area	0.9780	0.9657	0.9309	0.8299	0.6579	0.4755	0.3496	0.4027	0.6486	0.8849	0.9623	0.9812 (86)
MIT	19.9979	20.1499	20.4176	20.7466	20.9298	20.9873	20.9976	20.9954	20.9509	20.7021	20.3113	19.9801 (87)
Th 2	20.0210	20.0249	20.0287	20.0481	20.0514	20.0514	20.0514	20.0514	20.0514	20.0514	20.0442	20.0365 (88)
util rest of house	0.9726	0.9574	0.9145	0.7950	0.6033	0.4084	0.2751	0.3214	0.5740	0.8516	0.9517	0.9766 (89)
MIT 2	19.1294	19.2808	19.5408	19.8567	20.0073	20.0457	20.0507	20.0500	20.0258	19.8289	19.4563	19.1246 (90)
Living area fraction	19.4941	19.6457	19.9089	20.2304	20.3947	20.4411	20.4483	20.4470	20.4142	20.1956	19.8153	19.4838 (92)
Temperature adjustment	19.3441	19.4957	19.7589	20.0804	20.2447	20.2911	20.2983	20.2970	20.2642	20.0456	19.6653	-0.1500
adjusted MIT												19.3338 (93)

#### 8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	385.6151	413.0471	437.3964	436.1227	371.1683	257.2800	168.6421	177.3325	269.8213	343.5880	360.8956	371.5411 (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	711.9795	687.7383	622.0057	512.9259	390.5155	260.0987	169.0244	178.1044	281.7238	431.6892	579.0651	703.6951 (97)
Month fracti	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 kWh	242.8151	184.5925	137.3493	55.2983	14.3943	0.0000	0.0000	0.0000	0.0000	65.5473	157.0820	247.1226 (98)
Space heating												1104.2015 (98)
Space heating per m2												(98) / (4) = 25.0898 (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

	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													1220.1121 (211)
Space heating requirement	242.8151	184.5925	137.3493	55.2983	14.3943	0.0000	0.0000	0.0000	0.0000	65.5473	157.0820	247.1226	(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)	268.3040	203.9696	151.7672	61.1031	15.9053	0.0000	0.0000	0.0000	0.0000	72.4280	173.5713	273.0636	(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	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031	(64)
Efficiency of water heater (217)m	89.3634	89.2560	88.9938	88.3844	87.6872	87.3000	87.3000	87.3000	87.3000	88.4817	89.1116	89.3969	(216)
Fuel for water heating, kWh/month	144.3832	126.8768	132.3870	117.7483	115.0303	101.4025	95.6456	107.3601	107.9303	122.0578	130.3279	140.2768	(219)
Water heating fuel used													1441.4265 (219)
Annual totals kWh/year													
Space heating fuel - main system													1220.1121 (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)													31.9703 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													106.9703 (231)
Electricity for lighting (calculated in Appendix L)													209.5793 (232)
Total delivered energy for all uses													2978.0883 (238)

#### 10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1220.1121	3.4800	42.4599	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1441.4265	3.4800	50.1616	(247)
Mechanical ventilation fans	31.9703	13.1900	4.2169	(249)
Pumps and fans for heating	75.0000	13.1900	9.8925	(249)
Energy for lighting	209.5793	13.1900	27.6435	(250)
Additional standing charges			120.0000	(251)
Total energy cost			254.3744	(255)

#### 11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.2003 (257)
SAP value		83.2560
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	1220.1121	0.2160	263.5442	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1441.4265	0.2160	311.3481	(264)
Space and water heating			574.8924	(265)
Pumps and fans	106.9703	0.5190	55.5176	(267)
Energy for lighting	209.5793	0.5190	108.7716	(268)
Total kg/year			739.1816	(272)
CO2 emissions per m2			16.8000	(273)
EI value			88.8720	
EI rating			89	(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	$3.48 / 0.8832 = 3.940$ , stars = 4
Water heating environmental impact	$0.216 / 0.8832 = 0.2446$ , stars = 4

# FULL SAP CALCULATION PRINTOUT

## Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

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# 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 (m2)	Storey height (m)	Volume (m3)
Ground floor	44.0100 (1b)	2.4600 (2b)	108.2646 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	44.0100		108.2646 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 108.2646 (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)
Air changes per hour					
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				1	(19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.9250 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2317 (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 infilt rate	0.2954	0.2723	0.2665	0.2491	0.2491	0.2317	0.2317	0.2259	0.2317	0.2607	0.2549	0.2723 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5454	0.5223	0.5165	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5107	0.5049	0.5223 (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)			8.5400	1.3258	11.3220		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Clad	34.9590	8.5420	26.4170	0.2500	6.6043	61.0100	1611.7012 (29a)
Wl - To Corridor	13.3600	2.1170	11.2430	0.2499	2.8097	106.6200	1198.7287 (29a)
Total net area of external elements Aum(A, m2)			48.3200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	23.2800		(33)
Party Wall			18.2690	0.0000	0.0000	54.0300	987.0741 (32)
Party Floor			44.0060			40.0000	1760.2400 (32d)
Party Ceiling			44.0060			70.0000	3080.4200 (32b)
1st Floor Stud			88.0778			5.8200	512.6130 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	9150.7769 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							207.9249 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.5593 (36)
Total fabric heat loss						(33) + (36) =	27.8392 (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	19.4869	18.6590	18.4521	17.8637	17.8637	17.8637	17.8637	17.8637	17.8637	18.2451	18.0381	18.6590 (38)
Heat transfer coeff	47.3261	46.4983	46.2913	45.7029	45.7029	45.7029	45.7029	45.7029	45.7029	46.0843	45.8774	46.4983 (39)
Average = Sum(39)m / 12 =												46.0661 (39)
HLP	1.0753	1.0565	1.0518	1.0385	1.0385	1.0385	1.0385	1.0385	1.0385	1.0471	1.0424	1.0565 (40)
HLP (average)												1.0467 (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												1.5165 (42)
Average daily hot water use (litres/day)												70.2174 (43)
Daily hot water use	77.2391	74.4304	71.6217	68.8130	66.0043	63.1956	63.1956	66.0043	68.8130	71.6217	74.4304	77.2391 (44)
Energy conte	114.5434	100.1804	103.3772	90.1267	86.4787	74.6246	69.1506	79.3514	80.2991	93.5808	102.1508	110.9291 (45)
Energy content (annual)										Total = Sum(45)m =		1104.7928 (45)

# FULL SAP CALCULATION PRINTOUT

## Calculation Type: New Build (As Designed)



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

Distribution loss (46)m = 0.15 x (45)m	17.1815	15.0271	15.5066	13.5190	12.9718	11.1937	10.3726	11.9027	12.0449	14.0371	15.3226	16.6394 (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	14.4823	13.0648	14.4390	13.9444	14.3881	13.8998	14.3480	14.3740	13.9241	14.4180	13.9864	14.4740 (61)
Total heat required for water heating calculated for each month	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031 (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	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031 (64)
Heat gains from water heating, kWh/month	41.7063	36.5762	37.9827	33.4532	32.3512	28.2876	26.5796	29.9778	30.1805	34.7201	37.4617	40.5024 (65)
												1274.5357 (64)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913	90.9913 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	29.6681	26.3510	21.4300	16.2239	12.1276	10.2386	11.0632	14.3803	19.3013	24.5074	28.6037	30.4927 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	196.6178	198.6581	193.5166	182.5711	168.7544	155.7686	147.0933	145.0530	150.1945	161.1400	174.9567	187.9425 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156	45.6156 (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)	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609	-60.6609 (71)
Water heating gains (Table 5)	56.0568	54.4288	51.0520	46.4628	43.4828	39.2884	35.7253	40.2928	41.9173	46.6668	52.0302	54.4388 (72)
Total internal gains	361.2888	358.3839	344.9447	324.2039	303.3108	284.2416	272.8278	278.6722	290.3591	311.2602	334.5367	351.8200 (73)

#### 6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Northeast	4.8500	15.0428	0.5000	0.0000	0.7700	28.0887 (75)						
Northwest	3.6920	15.0428	0.5000	0.0000	0.7700	21.3822 (81)						
Solar gains	49.4709	86.6468	155.8705	259.8239	331.6626	381.3891	348.7642	285.4949	201.2779	112.2440	61.8174	38.4843 (83)
Total gains	410.7597	445.0307	500.8152	584.0278	634.9734	665.6308	621.5920	564.1671	491.6370	423.5043	396.3541	390.3043 (84)

#### 7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	53.7100	54.6662	54.9106	55.6175	55.6175	55.6175	55.6175	55.6175	55.6175	55.1572	55.4060	54.6662
alpha	4.5807	4.6444	4.6607	4.7078	4.7078	4.7078	4.7078	4.7078	4.7078	4.6771	4.6937	4.6444
util living area	0.9686	0.9544	0.9051	0.7747	0.5809	0.3819	0.2716	0.2990	0.5414	0.8243	0.9395	0.9726 (86)
MIT	20.1487	20.2802	20.5453	20.8271	20.9620	20.9956	20.9993	20.9990	20.9797	20.8116	20.4820	20.1435 (87)
Th 2	20.0210	20.0365	20.0404	20.0514	20.0514	20.0514	20.0514	20.0514	20.0514	20.0442	20.0481	20.0365 (88)
util rest of house	0.9606	0.9433	0.8834	0.7332	0.5227	0.3184	0.2022	0.2227	0.4624	0.7764	0.9223	0.9655 (89)
MIT 2	19.2773	19.4168	19.6700	19.9267	20.0296	20.0497	20.0513	20.0512	20.0425	19.9156	19.6229	19.2855 (90)
Living area fraction	19.6432	19.7793	20.0376	20.3048	20.4211	20.4469	20.4494	20.4492	20.4360	20.2919	19.9837	19.6458 (92)
Temperature adjustment	19.4932	19.6293	19.8876	20.1548	20.2711	20.2969	20.2994	20.2992	20.2860	20.1419	19.8337	-0.1500
adjusted MIT												19.4958 (93)

#### 8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	392.4027	417.3296	440.4545	431.0079	340.6747	222.9221	136.9927	136.9378	237.1779	331.0847	363.7430	374.9059 (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	666.9768	647.6897	582.6944	482.3854	350.5930	223.8015	137.0794	137.0707	241.5870	384.4286	524.5461	650.7805 (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	204.2832	154.8020	105.8265	36.9918	7.3792	0.0000	0.0000	0.0000	0.0000	39.6879	115.7782	205.2507 (98)
Space heating												869.9995 (98)
Space heating per m2												19.7682 (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													961.3254 (211)
Space heating requirement	204.2832	154.8020	105.8265	36.9918	7.3792	0.0000	0.0000	0.0000	0.0000	39.6879	115.7782	205.2507	(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)	225.7273	171.0519	116.9354	40.8749	8.1539	0.0000	0.0000	0.0000	0.0000	43.8540	127.9317	226.7964	(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	129.0257	113.2451	117.8162	104.0711	100.8669	88.5244	83.4986	93.7254	94.2231	107.9988	116.1372	125.4031	(64)
Efficiency of water heater (217)m	89.2338	89.1199	88.7855	88.1171	87.5109	87.3000	87.3000	87.3000	87.3000	88.1375	88.8687	89.2591	(216)
Fuel for water heating, kWh/month	144.5928	127.0706	132.6975	118.1055	115.2620	101.4025	95.6456	107.3601	107.9303	122.5345	130.6840	140.4933	(219)
Water heating fuel used													1443.7787 (219)
Annual totals kWh/year													
Space heating fuel - main system													961.3254 (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)													31.9703 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													106.9703 (231)
Electricity for lighting (calculated in Appendix L)													209.5793 (232)
Total delivered energy for all uses													2721.6537 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	961.3254	3.8700	37.2033 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1443.7787	3.8700	55.8742 (247)
Mechanical ventilation fans	31.9703	18.9000	6.0424 (249)
Pumps and fans for heating	75.0000	18.9000	14.1750 (249)
Energy for lighting	209.5793	18.9000	39.6105 (250)
Additional standing charges			93.0000 (251)
Total energy cost			245.9054 (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	961.3254	0.2160	207.6463 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1443.7787	0.2160	311.8562 (264)
Space and water heating			519.5025 (265)
Pumps and fans	106.9703	0.5190	55.5176 (267)
Energy for lighting	209.5793	0.5190	108.7716 (268)
Total kg/year			683.7917 (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	961.3254	1.2200	1172.8170 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1443.7787	1.2200	1761.4101 (264)
Space and water heating			2934.2270 (265)
Pumps and fans	106.9703	3.0700	328.3989 (267)
Energy for lighting	209.5793	3.0700	643.4084 (268)
Primary energy kWh/year			3906.0344 (272)
Primary energy kWh/m2/year			88.7533 (273)

#### SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 83  
 Current environmental impact rating: B 89

# 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	Already installed
F	Not considered
G	Not considered
H	Not considered
I	Not considered
J	Not considered
K	Not considered
M	Not considered
N Solar water heating	Not applicable
O	Not considered
P	Not considered
R	Not considered
S	Not considered
T	Not considered
U Solar photovoltaic panels	Not applicable
A2	Not considered
A3	Not considered
T2	Not considered
W	Not considered
X	Not considered
Y	Not considered
J2	Not considered
Q2	Not considered
Z1	Not considered
Z2	Not considered
Z3	Not considered
Z4	Not considered
Z5	Not considered
V2 Wind turbine	Not applicable
L2	Not considered
Q3	Not considered
O3	Not considered

Recommended measures: (none)	SAP change	Cost change	CO2 change
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Recommended measures (none)	Typical annual savings	Energy efficiency	Environmental impact
	Total Savings £0	0.00 kg/m <sup>2</sup>	

Potential energy efficiency rating: B 83  
 Potential environmental impact rating: B 89

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	£60	£60	£0
Mains gas	£186	£186	£0
Space heating	£150	£150	£0
Water heating	£56	£56	£0
Lighting	£40	£40	£0
Total cost of fuels	£246	£246	£0
Total cost of uses	£246	£246	£0
Delivered energy	62 kWh/m <sup>2</sup>	62 kWh/m <sup>2</sup>	0 kWh/m <sup>2</sup>
Carbon dioxide emissions	0.7 tonnes	0.7 tonnes	0.0 tonnes
CO2 emissions per m <sup>2</sup>	16 kg/m <sup>2</sup>	16 kg/m <sup>2</sup>	0 kg/m <sup>2</sup>
Primary energy	89 kWh/m <sup>2</sup>	89 kWh/m <sup>2</sup>	0 kWh/m <sup>2</sup>

# FULL SAP CALCULATION PRINTOUT

## Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

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SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)  
CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014  
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No improvements selected / applicable

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# 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  
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No improvements selected / applicable



# BASIC COMPLIANCE REPORT

## Calculation Type: New Build (As Designed)



<b>Property Reference</b>	671 - PRJ009149	<b>Issued on Date</b>	26/02/2021
<b>Assessment Reference</b>	671	<b>Prop Type Ref</b>	Block B
<b>Property</b>	Plot 671		

<b>SAP Rating</b>	83 B	<b>DER</b>	18.83	<b>TER</b>	20.44
<b>Environmental</b>	89 B	<b>% DER&lt;TER</b>	7.90		
<b>CO<sub>2</sub> Emissions (t/year)</b>	0.68	<b>DFEE</b>	43.72	<b>TFEE</b>	47.99
<b>General Requirements Compliance</b>	Pass	<b>% DFEE&lt;TFEE</b>	8.90		

<b>Assessor Details</b>	Mr. Michael Juckes, Michael Juckes, Tel: 02033971373, michael@briaryenergy.co.uk	<b>Assessor ID</b>	T850-0001
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<b>Client</b>	
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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)	20.44	kgCO <sub>2</sub> /m <sup>2</sup>	
Dwelling Carbon Dioxide Emission Rate (DER)	18.83	kgCO <sub>2</sub> /m <sup>2</sup>	Pass
	-1.61 (-7.9%)	kgCO <sub>2</sub> /m <sup>2</sup>	

##### 1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	47.99	kWh/m <sup>2</sup> /yr	
Dwelling Fabric Energy Efficiency (DFEE)	43.72	kWh/m <sup>2</sup> /yr	
	-4.3 (-9.0%)	kWh/m <sup>2</sup> /yr	Pass

#### Criterion 2 – Limits on design flexibility

##### Limiting Fabric Standards

##### 2 Fabric U-values

Element	Average	Highest	
External wall	0.25 (max. 0.30)	0.25 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Openings	1.36 (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 North West

Air change rate

Blinds/curtains

## Criterion 4 – Building performance consistent with DER and DFEE rate

### Party Walls

Type	U-value	W/m <sup>2</sup> K	
Filled Cavity with Edge Sealing	<input type="text" value="0.00"/>	W/m <sup>2</sup> K	<input type="text" value="Pass"/>

### Air permeability and pressure testing

#### 3 Air permeability

Air permeability at 50 pascals

Maximum

### 10 Key features

Party wall U-value  W/m<sup>2</sup>K

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