

PREDICTED ENERGY ASSESSMENT



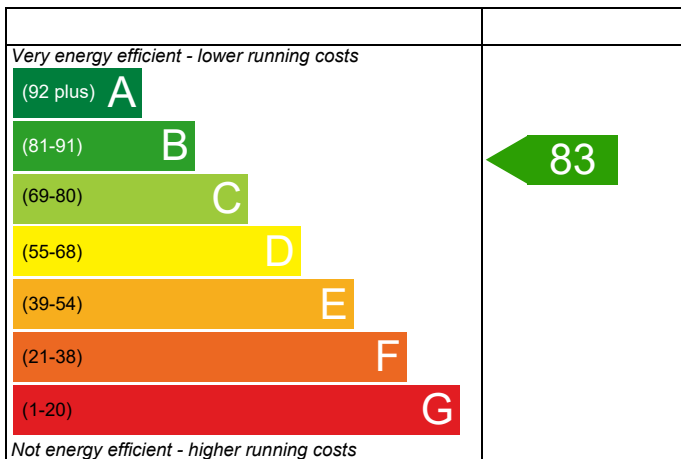
Plot 688

Dwelling type: Flat, Mid-Terrace
 Date of assessment: 26/02/2021
 Produced by: Michael Juckes
 Total floor area: 50.62 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.

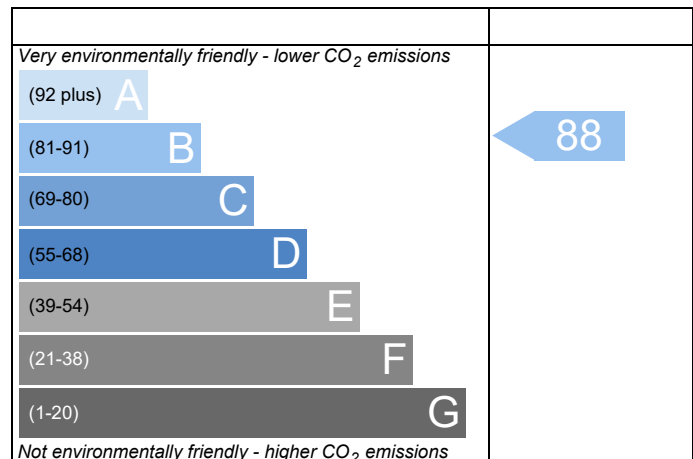
Energy Efficiency Rating



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	688 - PRJ009149		Issued on Date	26/02/2021	
Assessment Reference	688	Prop Type Ref	Block B		
Property	Plot 688				
SAP Rating	83 B	DER	18.82	TER	20.60
Environmental	88 B	% DER<TER	8.65		
CO ₂ Emissions (t/year)	0.80	DFEE	45.70	TFEE	52.76
General Requirements Compliance	Pass	% DFEE<TFEE	13.37		
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)	20.60	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	18.82	kgCO ₂ /m ²	Pass
	-1.78 (-8.6%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	52.76	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	45.70	kWh/m ² /yr	
	-7.1 (-13.4%)	kWh/m ² /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
Roof	0.11 (max. 0.20)	0.11 (max. 0.35)	Pass
Openings	1.37 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	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)

Medium

Pass

Based on:

Overshading

Average

Windows facing North East

4.71 m², No overhang

Windows facing North West

5.48 m², No overhang

Air change rate

3.87 ach

Blinds/curtains

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

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type

U-value

Filled Cavity with Edge Sealing

0.00

W/m²K

Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.01 (design value) m³/(h.m²) @ 50 Pa

Maximum

10.0 m³/(h.m²) @ 50 Pa

Pass

10 Key features

Party wall U-value

0.00

W/m²K

Roof U-value

0.11

W/m²K

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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	688 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	688	Prop Type Ref	Block B
Property	Plot 688		

SAP Rating	83 B	DER	18.82	TER	20.60
Environmental	88 B	% DER<TER	8.65		
CO ₂ Emissions (t/year)	0.80	DFEE	45.70	TTEE	52.76
General Requirements Compliance	Pass	% DFEE<TTEE	13.37		

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) (1b)	Storey height (m) (2b)	Volume (m ³) (1b) - (3b)
Ground floor	50.6200		125.0314 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.6200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	125.0314 (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							
Pressure test					0.0000 / (5) =							
Measured/design AP50					Yes							
Infiltration rate					5.0100							
Number of sides sheltered					0.2505 (18)							
					2 (19)							
Shelter factor					(20) = 1 - [0.075 x (19)] =							
Infiltration rate adjusted to include shelter factor					(21) = (18) x (20) =							
					0.8500 (20)							
					0.2129 (21)							
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind factor	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)
Adj infilt rate	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)
	0.2715	0.2502	0.2449	0.2289	0.2289	0.2129	0.2129	0.2076	0.2129	0.2395	0.2342	0.2502 (22b)
Mechanical extract ventilation - decentralised												
If mechanical ventilation:												
Effective ac	0.5215	0.5002	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5002 (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)			10.1800	1.3258	13.5095		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
W1 - Clad	36.1340	10.1830	25.9510	0.2500	6.4878	61.0100	1583.2705 (29a)
W1 - To Corridor	3.9200	2.1170	1.8030	0.2499	0.4506	106.6200	192.2359 (29a)
RF - Ins Joist	50.6170		50.6170	0.1100	5.5679	5.8200	294.5909 (30)
Total net area of external elements Aum(A, m ²)			90.6810				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		28.5597		(33)
Party Wall			32.2120	0.0000	0.0000	54.0300	1740.4144 (32)
Party Floor			50.6170			40.0000	2024.6800 (32d)
1st Floor Stud			97.9750			5.8200	570.2146 (32c)
Heat capacity Cm = Sum(A x k)			(28)...(30) + (32) + (32a)...(32e) =				6405.4063 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							126.5390 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							6.4452 (36)
Total fabric heat loss			(33) + (36) =				35.0049 (37)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	21.5164	20.6379	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6379 (38)
Average = Sum(39)m / 12 =	56.5213	55.6428	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6428 (39) 55.7102 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1166	1.0992	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0992 (40) 1.1006 (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													1.7084 (42)
Average daily hot water use (litres/day)													74.7737 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy content (annual)	82.2511	79.2601	76.2692	73.2782	70.2873	67.2963	67.2963	70.2873	73.2782	76.2692	79.2601	82.2511 (44)	
Distribution loss (46)m = 0.15 x (45)m	121.9760	106.6810	110.0852	95.9749	92.0902	79.4669	73.6377	84.5004	85.5096	99.6532	108.7792	118.1272 (45)	
Water storage loss:	Total = Sum(45)m = 1176.4816 (45)												
Total storage loss	18.2964	16.0021	16.5128	14.3962	13.8135	11.9200	11.0457	12.6751	12.8264	14.9480	16.3169	17.7191 (46)	
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 (56)	
Combi 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 (57)	
Total heat required for water heating calculated for each month	14.5179	13.0947	14.4688	13.9693	14.4111	13.9187	14.3656	14.3951	13.9463	14.4449	14.0170	14.5084 (61)	
Solar input	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356 (62)	
Output from w/h	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)	
RHI water heating demand	Solar input (sum of months) = Sum(63)m = 0.0000 (63)												
Heat gains from water heating, kWh/month	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356 (64)	
	Total per year (kWh/year) = Sum(64)m = 1346.5393 (64) 1347 (64)												
44.1865	38.7451	40.2205	35.4040	34.2228	29.9024	28.0759	31.6952	31.9185	36.7459	39.6733	42.9044	45.5084 (65)	

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	33.3877	29.6547	24.1168	18.2580	13.6480	11.5223	12.4502	16.1832	21.7211	27.5799	32.1899	34.3156 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	222.1554	224.4607	218.6514	206.2843	190.6730	176.0005	166.1985	163.8932	169.7024	182.0696	197.6809	212.3533 (68)
Pumps, fans	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586 (69)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Water heating gains (Table 5)	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347 (71)
Total internal gains	59.3904	57.6564	54.0598	49.1722	45.9984	41.5311	37.7365	42.6010	44.3313	49.3897	55.1019	57.6672 (72)
	399.0594	395.8976	380.9540	357.8404	334.4453	313.1798	300.5110	306.8033	319.8807	343.1651	369.0985	388.4620 (73)

6. Solar gains

[Jan]	Area	Solar flux	g	FF	Access	Gains						
	m ²	Table 6a	Specific data	Specific data	factor data	W						
		W/m ²	or Table 6b	or Table 6c	Table 6d							
Northeast	4.7080	15.0428	0.5000	0.0000	0.7700	27.2663 (75)						
Northwest	5.4750	15.0428	0.5000	0.0000	0.7700	31.7084 (81)						
Solar gains	58.9748	103.2925	185.8147	309.7386	395.3781	454.6576	415.7651	340.3412	239.9453	133.8072	73.6932	45.8775 (83)
Total gains	458.0342	499.1902	566.7687	667.5789	729.8234	767.8375	716.2761	647.1445	559.8259	476.9723	442.7916	434.3395 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
alpha	31.4798	31.9768	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812	31.9768	
util living area	3.0987	3.1318	3.1321	3.1321	3.1321	3.1321	3.1321	3.1321	3.1321	3.1321	3.1321	3.1318	
MIT	0.9322	0.9126	0.8564	0.7382	0.5726	0.3911	0.2832	0.3120	0.5422	0.7840	0.8972	0.9385 (86)	
Th 2	19.6020	19.7770	20.1445	20.5630	20.8472	20.9652	20.9908	20.9879	20.9065	20.5739	20.0614	19.5943 (87)	
util rest of house	19.9873	20.0015	20.0016	20.0016	20.0016	20.0016	20.0016	20.0016	20.0016	20.0016	20.0016	20.0015 (88)	
MIT 2	0.9210	0.8987	0.8341	0.7014	0.5190	0.3262	0.2086	0.2304	0.4674	0.7409	0.8778	0.9281 (89)	
	18.7495	18.9287	19.2787	19.6602	19.8996	19.9845	19.9988	19.9979	19.9503	19.6836	19.2080	18.7535 (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) =	0.4417 (91)	
MIT	19.1261	19.3034	19.6612	20.0590	20.3182	20.4177	20.4370	20.4352	20.3727	20.0769	19.5850	19.1249 (92)
Temperature adjustment												-0.1500
adjusted MIT	18.9761	19.1534	19.5112	19.9090	20.1682	20.2677	20.2870	20.2852	20.2227	19.9269	19.4350	18.9749 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9073	0.8847	0.8217	0.6977	0.5283	0.3439	0.2302	0.2539	0.4847	0.7374	0.8648	0.9150 (94)
Useful gains	415.5954	441.6526	465.7307	465.7828	385.5929	264.0218	164.8654	164.3318	271.3675	351.6988	382.9227	397.4142 (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	767.3380	748.5848	679.3690	573.5416	421.0572	270.8156	166.1827	166.0819	290.5639	452.1385	613.9314	749.7834 (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	261.6965	206.2584	158.9469	77.5863	26.3854	0.0000	0.0000	0.0000	0.0000	74.7271	166.3262	262.1627 (98)
RHI space heating demand												1234 (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	50.6200 (1b)	x 2.4700 (2b)	= 125.0314 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.6200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 125.0314 (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)
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				2	(19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.8500 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2129 (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				0.2342	0.2289	0.2023	0.2023	0.1970	0.2129	0.2289	0.2395	0.2502 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												
Effective ac	0.5215	0.5162	0.5108	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5002 (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)			10.1800	1.3258	13.5095		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Clad	36.1340	10.1830	25.9510	0.2500	6.4878	61.0100	1583.2705 (29a)
Wl - To Corridor	3.9200	2.1170	1.8030	0.2499	0.4506	106.6200	192.2359 (29a)
Rf - Ins Joist	50.6170		50.6170	0.1100	5.5679	5.8200	294.5909 (30)
Total net area of external elements Aum(A, m ²)			90.6810				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	28.5597		(33)
Party Wall			32.2120	0.0000	0.0000	54.0300	1740.4144 (32)
Party Floor			50.6170			40.0000	2024.6800 (32d)
1st Floor Stud			97.9750			5.8200	570.2146 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 6405.4063 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							126.5390 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							6.4452 (36)
Total fabric heat loss						(33) + (36) =	35.0049 (37)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	21.5164	21.2968	21.0772	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6379 (38)
Heat transfer coeff	56.5213	56.3017	56.0821	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6428 (39)
Average = Sum(39)m / 12 =												55.8024 (39)
HLP	1.1166	1.1122	1.1079	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0992 (40)
HLP (average)												1.1024 (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												1.7084 (42)
Average daily hot water use (litres/day)												74.7737 (43)
Daily hot water use	82.2511	79.2601	76.2692	73.2782	70.2873	67.2963	67.2963	70.2873	73.2782	76.2692	79.2601	82.2511 (44)
Energy conte	121.9760	106.6810	110.0852	95.9749	92.0902	79.4669	73.6377	84.5004	85.5096	99.6532	108.7792	118.1272 (45)
Energy content (annual)												Total = Sum(45)m = 1176.4816 (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	18.2964	16.0021	16.5128	14.3962	13.8135	11.9200	11.0457	12.6751	12.8264	14.9480	16.3169	17.7191 (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	14.5179	13.0947	14.4688	13.9693	14.4111	13.9187	14.3656	14.3951	13.9463	14.4449	14.0170	14.5084 (61)
Total heat required for water heating calculated for each month	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356 (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	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356 (64)
Heat gains from water heating, kWh/month	44.1865	38.7451	40.2205	35.4040	34.2228	29.9024	28.0759	31.6952	31.9185	36.7459	39.6733	42.9044 (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	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	33.3877	29.6547	24.1168	18.2580	13.6480	11.5223	12.4502	16.1832	21.7211	27.5799	32.1899	34.3156 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	222.1554	224.4607	218.6514	206.2843	190.6730	176.0005	166.1985	163.8932	169.7024	182.0696	197.6809	212.3533 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586 (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)	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347 (71)
Water heating gains (Table 5)	59.3904	57.6564	54.0598	49.1722	45.9984	41.5311	37.7365	42.6010	44.3313	49.3897	55.1019	57.6672 (72)
Total internal gains	399.0594	395.8976	380.9540	357.8404	334.4453	313.1798	300.5110	306.8033	319.8807	343.1651	369.0985	388.4620 (73)

6. Solar gains

[Jan]	Area	Solar flux	g	FF	Access	Gains
	m ²	Table 6a	Specific data	Specific data	factor	W
		W/m ²	or Table 6b	or Table 6c	Table 6d	
Northeast	4.7080	11.2829	0.5000	0.0000	0.7700	20.4512 (75)
Northwest	5.4750	11.2829	0.5000	0.0000	0.7700	23.7830 (81)
Solar gains	44.2343	90.0401	162.2237	266.4179	358.1179	381.7916
Total gains	443.2937	485.9378	543.1776	624.2582	692.5631	694.9714

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	31.4798	31.6026	31.7264	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812
alpha	3.0987	3.1068	3.1151	3.1321	3.1321	3.1321	3.1321	3.1321	3.1321	3.1321	3.1321	3.1318
util living area	0.9466	0.9275	0.8834	0.7858	0.6388	0.4795	0.3615	0.4143	0.6357	0.8413	0.9247	0.9521 (86)
MIT	19.3882	19.5971	19.9725	20.4355	20.7683	20.9295	20.9781	20.9664	20.8305	20.3902	19.8238	19.3604 (87)
Th 2	19.9873	19.9908	19.9944	20.0016	20.0016	20.0016	20.0016	20.0016	20.0016	20.0016	20.0016	20.0015 (88)
util rest of house	0.9380	0.9161	0.8651	0.7539	0.5900	0.4141	0.2836	0.3311	0.5686	0.8093	0.9109	0.9443 (89)
MIT 2	18.5398	18.7458	19.1101	19.5473	19.8371	19.9622	19.9931	19.9876	19.8963	19.5186	18.9790	18.5234 (90)
Living area fraction	18.9146	19.1218	19.4910	19.9396	20.2484	20.3895	20.4282	20.4200	20.3090	19.9036	19.3522	18.8931 (92)
Temperature adjustment	18.7646	18.9718	19.3410	19.7896	20.0984	20.2395	20.2782	20.2700	20.1590	19.7536	19.2022	-0.1500
adjusted MIT												18.7431 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	410.1420	438.4057	462.4309	466.0258	412.0791	298.9413	200.9691	209.4386	300.1162	362.6583	381.2269	395.8075 (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	817.5583	792.2691	720.1511	605.8466	467.2460	313.7525	204.6384	215.3069	337.0913	509.2611	673.3053	809.2185 (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	303.1177	237.7962	191.7439	100.6710	41.0441	0.0000	0.0000	0.0000	0.0000	109.0725	210.2964	307.5778 (98)
Space heating												1501.3196 (98)
Space heating per m ²												(98) / (4) = 29.6586 (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													1658.9167 (211)
Space heating requirement	303.1177	237.7962	191.7439	100.6710	41.0441	0.0000	0.0000	0.0000	0.0000	109.0725	210.2964	307.5778	(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)	334.9367	262.7582	211.8717	111.2387	45.3526	0.0000	0.0000	0.0000	0.0000	120.5221	232.3717	339.8650	(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	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356	(64)
Efficiency of water heater (217)m	89.4816	89.4023	89.2123	88.8008	88.1672	87.3000	87.3000	87.3000	87.3000	88.8352	89.2934	89.5114	(216)
Fuel for water heating, kWh/month	152.5384	133.9739	139.6153	123.8099	120.7947	106.9709	100.8056	113.2823	113.9243	128.4380	137.5200	148.1773	(219)
Water heating fuel used													1519.8506 (219)
Annual totals kWh/year													
Space heating fuel - main system													1658.9167 (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)													36.9215 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													111.9215 (231)
Electricity for lighting (calculated in Appendix L)													235.8549 (232)
Total delivered energy for all uses													3526.5437 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	1658.9167	3.4800	57.7303	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	1519.8506	3.4800	52.8908	(247)
Mechanical ventilation fans	36.9215	13.1900	4.8700	(249)
Pumps and fans for heating	75.0000	13.1900	9.8925	(249)
Energy for lighting	235.8549	13.1900	31.1093	(250)
Additional standing charges			120.0000	(251)
Total energy cost			276.4928	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.2145 (257)
SAP value		83.0582
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	1658.9167	0.2160	358.3260	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1519.8506	0.2160	328.2877	(264)
Space and water heating			686.6137	(265)
Pumps and fans	111.9215	0.5190	58.0873	(267)
Energy for lighting	235.8549	0.5190	122.4087	(268)
Total kg/year			867.1097	(272)
CO2 emissions per m2			17.1300	(273)
EI value			87.8485	
EI rating			88	(274)
EI band			B	

Calculation of stars for heating and DHW

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.9050 = 3.845$, 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	$3.48 / 0.8849 = 3.933$, stars = 4
Water heating environmental impact	$0.216 / 0.8849 = 0.2441$, stars = 4

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

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	50.6200 (1b)	x 2.4700 (2b)	= 125.0314 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.6200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 125.0314 (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				2	(19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.8500 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.2129 (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	0.2715	0.2502	0.2449	0.2289	0.2289	0.2129	0.2129	0.2076	0.2129	0.2395	0.2342	0.2502 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation:												0.5000 (23a)
Effective ac	0.5215	0.5002	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5002 (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)			10.1800	1.3258	13.5095		(27)
Solid Door			2.1200	1.2000	2.5440		(26)
Wl - Clad	36.1340	10.1830	25.9510	0.2500	6.4878	61.0100	1583.2705 (29a)
Wl - To Corridor	3.9200	2.1170	1.8030	0.2499	0.4506	106.6200	192.2359 (29a)
Rf - Ins Joist	50.6170		50.6170	0.1100	5.5679	5.8200	294.5909 (30)
Total net area of external elements Aum(A, m2)			90.6810				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	28.5597		(33)
Party Wall			32.2120	0.0000	0.0000	54.0300	1740.4144 (32)
Party Floor			50.6170			40.0000	2024.6800 (32d)
1st Floor Stud			97.9750			5.8200	570.2146 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	6405.4063 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							126.5390 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							6.4452 (36)
Total fabric heat loss						(33) + (36) =	35.0049 (37)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	21.5164	20.6379	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6302	20.6379 (38)
Heat transfer coeff	56.5213	55.6428	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6351	55.6428 (39)
Average = Sum(39)m / 12 =												55.7102 (39)
HLP	1.1166	1.0992	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0991	1.0992 (40)
HLP (average)												1.1006 (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												1.7084 (42)
Average daily hot water use (litres/day)												74.7737 (43)
Daily hot water use	82.2511	79.2601	76.2692	73.2782	70.2873	67.2963	67.2963	70.2873	73.2782	76.2692	79.2601	82.2511 (44)
Energy conte	121.9760	106.6810	110.0852	95.9749	92.0902	79.4669	73.6377	84.5004	85.5096	99.6532	108.7792	118.1272 (45)
Energy content (annual)										Total = Sum(45)m =		1176.4816 (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	18.2964	16.0021	16.5128	14.3962	13.8135	11.9200	11.0457	12.6751	12.8264	14.9480	16.3169	17.7191 (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	14.5179	13.0947	14.4688	13.9693	14.4111	13.9187	14.3656	14.3951	13.9463	14.4449	14.0170	14.5084 (61)
Total heat required for water heating calculated for each month	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356 (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	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356 (64)
Heat gains from water heating, kWh/month	44.1865	38.7451	40.2205	35.4040	34.2228	29.9024	28.0759	31.6952	31.9185	36.7459	39.6733	42.9044 (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	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020	102.5020 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	33.3877	29.6547	24.1168	18.2580	13.6480	11.5223	12.4502	16.1832	21.7211	27.5799	32.1899	34.3156 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	222.1554	224.4607	218.6514	206.2843	190.6730	176.0005	166.1985	163.8932	169.7024	182.0696	197.6809	212.3533 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586	46.9586 (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)	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347	-68.3347 (71)
Water heating gains (Table 5)	59.3904	57.6564	54.0598	49.1722	45.9984	41.5311	37.7365	42.6010	44.3313	49.3897	55.1019	57.6672 (72)
Total internal gains	399.0594	395.8976	380.9540	357.8404	334.4453	313.1798	300.5110	306.8033	319.8807	343.1651	369.0985	388.4620 (73)

6. Solar gains

[Jan]	Area	Solar flux	g	FF	Access	Gains
	m ²	Table 6a	Specific data	Specific data	factor	W
		W/m ²	or Table 6b	or Table 6c	Table 6d	
Northeast	4.7080	15.0428	0.5000	0.0000	0.7700	27.2663 (75)
Northwest	5.4750	15.0428	0.5000	0.0000	0.7700	31.7084 (81)
Solar gains	58.9748	103.2925	185.8147	309.7386	395.3781	454.6576
Total gains	458.0342	499.1902	566.7687	667.5789	729.8234	767.8375

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	31.4798	31.9768	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812	31.9812	31.9768
alpha	3.0987	3.1318	3.1321	3.1321	3.1321	3.1321	3.1321	3.1321	3.1321	3.1321	3.1321	3.1318
util living area	0.9322	0.9126	0.8564	0.7382	0.5726	0.3911	0.2832	0.3120	0.5422	0.7840	0.8972	0.9385 (86)
MIT	19.6020	19.7770	20.1445	20.5630	20.8472	20.9652	20.9908	20.9879	20.9065	20.5739	20.0614	19.5943 (87)
Th 2	19.9873	20.0015	20.0016	20.0016	20.0016	20.0016	20.0016	20.0016	20.0016	20.0016	20.0016	20.0015 (88)
util rest of house	0.9210	0.8987	0.8341	0.7014	0.5190	0.3262	0.2086	0.2304	0.4674	0.7409	0.8778	0.9281 (89)
MIT 2	18.7495	18.9287	19.2787	19.6602	19.8996	19.9845	19.9988	19.9979	19.9503	19.6836	19.2080	18.7535 (90)
Living area fraction	19.1261	19.3034	19.6612	20.0590	20.3182	20.4177	20.4370	20.4352	20.3727	20.0769	19.5850	19.1249 (92)
Temperature adjustment	18.9761	19.1534	19.5112	19.9090	20.1682	20.2677	20.2870	20.2852	20.2227	19.9269	19.4350	-0.1500
adjusted MIT												18.9749 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9073	0.8847	0.8217	0.6977	0.5283	0.3439	0.2302	0.2539	0.4847	0.7374	0.8648	0.9150 (94)
Ext temp.	415.5954	441.6526	465.7307	465.7828	385.5929	264.0218	164.8654	164.3318	271.3675	351.6988	382.9227	397.4142 (95)
Heat loss rate W	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)
Month fracti	767.3380	748.5848	679.3690	573.5416	421.0572	270.8156	166.1827	166.0819	290.5639	452.1385	613.9314	749.7834 (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 per m ²	261.6965	206.2584	158.9469	77.5863	26.3854	0.0000	0.0000	0.0000	0.0000	74.7271	166.3262	262.1627 (98)
												1234.0895 (98)
												(98) / (4) = 24.3795 (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													1363.6348 (211)
Space heating requirement	261.6965	206.2584	158.9469	77.5863	26.3854	0.0000	0.0000	0.0000	0.0000	74.7271	166.3262	262.1627	(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)	289.1674	227.9099	175.6319	85.7308	29.1552	0.0000	0.0000	0.0000	0.0000	82.5714	183.7859	289.6825	(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	136.4939	119.7757	124.5540	109.9442	106.5013	93.3856	88.0033	98.8955	99.4559	114.0981	122.7962	132.6356	(64)
Efficiency of water heater (217)m	89.3770	89.2975	89.0657	88.5961	87.9172	87.3000	87.3000	87.3000	87.3000	88.5390	89.1127	89.3991	(217)
Fuel for water heating, kWh/month	152.7170	134.1311	139.8451	124.0961	121.1382	106.9709	100.8056	113.2823	113.9243	128.8677	137.7988	148.3635	(219)
Water heating fuel used													1521.9406 (219)
Annual totals kWh/year													
Space heating fuel - main system													1363.6348 (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)													36.9215 (230a)
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													111.9215 (231)
Electricity for lighting (calculated in Appendix L)													235.8549 (232)
Total delivered energy for all uses													3233.3518 (238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1363.6348	3.8700	52.7727 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1521.9406	3.8700	58.8991 (247)
Mechanical ventilation fans	36.9215	18.9000	6.9782 (249)
Pumps and fans for heating	75.0000	18.9000	14.1750 (249)
Energy for lighting	235.8549	18.9000	44.5766 (250)
Additional standing charges			93.0000 (251)
Total energy cost			270.4015 (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	1363.6348	0.2160	294.5451 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1521.9406	0.2160	328.7392 (264)
Space and water heating			623.2843 (265)
Pumps and fans	111.9215	0.5190	58.0873 (267)
Energy for lighting	235.8549	0.5190	122.4087 (268)
Total kg/year			803.7802 (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	1363.6348	1.2200	1663.6345 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1521.9406	1.2200	1856.7675 (264)
Space and water heating			3520.4020 (265)
Pumps and fans	111.9215	3.0700	343.5991 (267)
Energy for lighting	235.8549	3.0700	724.0745 (268)
Primary energy kWh/year			4588.0756 (272)
Primary energy kWh/m2/year			90.6376 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 83
 Current environmental impact rating: B 88

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 ²	

Potential energy efficiency rating: B 83
 Potential environmental impact rating: B 88

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	£66	£66	£0
Mains gas	£205	£205	£0
Space heating	£167	£167	£0
Water heating	£59	£59	£0
Lighting	£45	£45	£0
Total cost of fuels	£271	£271	£0
Total cost of uses	£271	£271	£0
Delivered energy	64 kWh/m ²	64 kWh/m ²	0 kWh/m ²
Carbon dioxide emissions	0.8 tonnes	0.8 tonnes	0.0 tonnes
CO2 emissions per m ²	16 kg/m ²	16 kg/m ²	0 kg/m ²
Primary energy	91 kWh/m ²	91 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	688 - PRJ009149	Issued on Date	26/02/2021
Assessment Reference	688	Prop Type Ref	Block B
Property	Plot 688		

SAP Rating	83 B	DER	18.82	TER	20.60
Environmental	88 B	% DER<TER	8.65		
CO₂ Emissions (t/year)	0.80	DFEE	45.70	TFEE	52.76
General Requirements Compliance	Pass	% DFEE<TFEE	13.37		

Assessor Details	Mr. Michael Jukes, Michael Jukes, Tel: 02033971373, michael@briaryenergy.co.uk	Assessor ID	T850-0001
Client			

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	20.60	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	18.82	kgCO ₂ /m ²	Pass
	-1.78 (-8.6%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	52.76	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	45.70	kWh/m ² /yr	
	-7.1 (-13.4%)	kWh/m ² /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
Roof	0.11 (max. 0.20)	0.11 (max. 0.35)	Pass
Openings	1.37 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	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
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BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



Secondary heating system

None

5 Cylinder insulation

Hot water storage

No cylinder

6 Controls

Space heating controls

Programmer, room thermostat and TRVs

Pass

Hot water controls

No cylinder

Boiler interlock

Yes

Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100

%

Minimum

75

%

Pass

8 Mechanical ventilation

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)

Medium

Pass

Based on:

Overshading

Average

Windows facing North East

4.71 m², No overhang

Windows facing North West

5.48 m², No overhang

Air change rate

3.87 ach

Blinds/curtains

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

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type

U-value

Filled Cavity with Edge Sealing

0.00

W/m²K

Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.01 (design value)

Maximum

10.0

Pass

10 Key features

Party wall U-value

0.00

W/m²K

Roof U-value

0.11

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.